Doctor of Education, The University of Edinburgh
Presented in 2012

Learning about teaching as part of the undergraduate medical curriculum: perspectives and learning outcomes

Michael T Ross

THE UNIVERSITY of EDINBURGH

Learning about teaching as part of the undergraduate medical curriculum: perspectives and learning outcomes

Michael T Ross

THE UNIVERSITY *of* EDINBURGH

Doctor of Education
The University of Edinburgh
Presented in 2012

Published by The University of Edinburgh, Printed by Riley Dunn & Wilson Ltd.

Contents

(this page is intentionally blank)

Acknowledgements

Professor Carolin Kreber for her patience, perseverance, insight and scholarly approach to supervising and advising me throughout this research.

Professor Dai Hounsell for his insight, enthusiasm and encouragement as co-supervisor during my first year.

All of the participants in this research, without whom I would have nothing to say.

Dr Helen Cameron for being a source of encouragement, wisdom and support throughout this research, and for piloting the Delphi questionnaires.

Professor Allan Cumming for his encouragement to undertake the EdD, his helpful feedback on the research plan, and for piloting the Delphi questionnaires.

Dr Terese Stenfors-Hayes for being my critical friend, for always taking time to listen, read or comment, and for being a constant source of encouragement, advice and intellectual challenge.

Dr Carl Savage for many enjoyable and stimulating conversations, and for his insightful feedback on an earlier draft of this thesis.

Dr Charles Anderson for his challenging questions and helpful feedback on an earlier draft of this thesis.

Marshall Dozier for her help with the literature review strategy.

Dr Zeshan Quereshi for his helpful feedback on the FY2 interview questions and advice regarding the recruitment of FY2 participants.

Gill Aitken for looking after the MSc Clinical Education programme and helping me find time to work on this research, and for her helpful feedback on various aspects.

Katie Ross for helping collate the questionnaire data.

Members of the Centre for Medical Education at The University of Edinburgh for their support, feedback and suggestions on various aspects of the research.

Other staff and students on the EdD programme for their helpful feedback and suggestions, particularly during the planning stages of this research.

The CME Donations Fund for help with transcription costs.

The Allen and Margaret Wilson Memorial Fund for help with books, printing costs and refreshments for the interviews and focus groups.

All who listened and offered helpful feedback when I have presented aspects of this research at The University of Edinburgh, Karolinska Institutet in Stockholm, and the AMEE 2011 Conference in Vienna.

The numerous authors whose inspirational and instructional texts have contributed immeasurably to my thinking, enriching all aspects of this thesis.

The partners and staff of Primrose Lane Medical Centre for their encouragement and understanding, and for allowing me a short sabbatical from clinical work whilst undertaking part of this thesis.

The other members of the band 'Teannaich' – Dr Mark Neal, Andrew Christie, Colin Cairncross and Dr Jonathan Kemp – for being understanding when I had to miss, or was late for, performances because I was working on my thesis.

My family - particularly Melanie, Katie and Bethany - for your love, patience, thoughtfulness and support throughout the whole process. I couldn't have done it without you!

Abstract

The General Medical Council now requires that all new medical graduates in the United Kingdom should be able to 'function effectively as a teacher'. This thesis explores multiple perspectives on what this means, and the implications for medical student learning in relation to teaching. There is a lack of existing literature exploring how those involved in the undergraduate medical curriculum conceptualise teaching or what it means to function effectively as a teacher. There is also a lack of literature on what teaching recent medical graduates undertake, and what, if any, learning outcomes in teaching they and other key stakeholders think should be core for the undergraduate medical curriculum. To address these gaps in the literature, original data were gathered using 1) a Delphi study with eighteen experts in medical education, 2) semi-structured interviews with nineteen recent medical graduates, and 3) focus group interviews with twelve final year medical students. The three data sets were analysed individually, compared, then synthesised with the existing literature.

All three participant groups articulated a wide range of conceptions of teaching, with considerable variation both within and between groups. The great majority thought that all medical students should learn about teaching as part of the undergraduate medical curriculum. Almost all of the recent graduates and medical students viewed teaching as part of the role of junior doctors working in the UK, although only two thirds of the recent graduates said they saw themselves as teachers. The recent graduates reported having delivered a wide range of teaching in their first year of work as junior doctors, and this correlated well with the range of teaching medical students reported having received from junior doctors. Teaching undertaken by recent medical graduates could be grouped into three broad categories: informal opportunistic teaching, semi-formal pre-arranged teaching, and formal organised teaching. A total of 153 learning outcomes in teaching were suggested and rated by the expert Delphi panel in terms of how appropriate they were for UK undergraduate medical curricula. Many of the graduates and students also suggested some learning outcomes in teaching before rating the 153 learning outcomes arising from the Delphi. All three groups indicated that they thought most of the 153 learning outcomes in teaching should be core for all UK undergraduate medical curricula, although there was some variation within and between groups. The majority of these learning outcomes have not been previously suggested in the literature for UK undergraduate medical curricula, but are consistent with literature on teaching competencies expected of more senior doctors.

This thesis offers new insights on what teaching means to experts in medical education, recent medical graduates and current students, comparing these between groups and with the educational literature. It also offers multiple perspectives on core learning outcomes in teaching for UK undergraduate medical curricula, and greater understanding of the teaching undertaken by UK medical graduates. This thesis could help those responsible for undergraduate medical curricula to prioritise, refine and exemplify detailed learning outcomes in teaching, ensuring their graduates are more prepared for practice. It will also be of interest to policy-makers, programme directors, teachers, students, junior doctors, administrators and academics involved in medical and allied healthcare education. It is hoped that this

thesis will encourage stakeholders to reflect on what teaching means to them, the role of junior doctors as teachers and the implications of learning about teaching as part of the undergraduate medical curriculum, leading to greater engagement, scholarly debate and research in this area. This in turn may lead to doctors delivering better quality teaching, to students and trainees in medicine and other disciplines receiving better teaching, and consequently to patients experiencing better healthcare.

Chapter 1: Introduction

Overview

This chapter outlines the background and context of this thesis, defines the research problem, purpose and aims, and explains the motivation for undertaking this research. The needs of diverse audiences which this thesis hopes to speak to are then identified and targeted, and the intended contribution that this thesis will make to the literature is outlined. This chapter concludes with an overview of the thesis as a whole.

Background

Doctors at all stages in their career may be called-upon to teach (GMC 2011d). The word 'doctor' actually comes from the Latin word '*docere*', to teach (Soanes and Hawker 2005). However, previous work suggests that many medical teachers identify themselves as doctors who teach rather than as 'teachers', and therefore may not regard teaching as a distinct role in itself (Stone *et al.* 2002; Higgs and McAllister 2007). As Taylor *et al.* (2007, p371) observe, "Most who teach in clinical settings see themselves primarily as clinicians or physicians responsible for patient care and only secondarily as educators". Medical training in the UK and elsewhere has developed to prepare novices for clinical practice in different contexts and speciality areas. It has often been assumed that once medical doctors reach a certain level of clinical expertise they will also be able to teach in that specialist field without any specific training in teaching. Some doctors still hold this view (Stenfors-Hayes *et al.* 2011a; Spencer 2003). The emergence of junior doctors who seek to develop a career in medical education is a relatively recent phenomenon, and even now further training in education is typically undertaken alongside or after completion of specialist clinical training (ASME 2005; Norman 2011). Medical education is not currently recognised as a medical speciality in its own right in the UK, nor offered as a specialist training programme to junior doctors (GMC 2010a).

Doctors frequently explain symptoms and signs of illness, patterns of disease, investigation and treatment options to patients. They also offer advice to patients on lifestyle changes, self-help measures, illness prevention, further investigation, referral and treatment. Typically this is undertaken one to one with individual patients, with or without their family members or carers. Sometimes, with antenatal, self-help or smoking-cessation groups, it may involve multiple patients however (Tate 2002). Medical students and trainees are now typically taught and assessed in many of these areas under the broad heading of 'communication skills' or 'consultation skills', and along with being able to take a medical history and perform a physical examination, these are generally considered to be integral to everyday clinical practice and patient care (von Fragstein *et al.* 2008; Aspegren 1999). Although such activities might be considered as forms of teaching, because they focus on individual patient needs and experiences, with the aim of enabling patients and their carers to better manage their health and illnesses, they are beyond the scope of this thesis.

Even doctors who have only just qualified may be called upon to teach medical students, other doctors at the same or more senior level, and other qualified and trainee members of the healthcare team such as nurses or physiotherapists (GMC 2011g; GMC 1999). Such teaching typically focuses on helping these clinicians and trainees to learn a very broad range of clinical knowledge and skills so they are better able to deliver patient care. The teaching that junior doctors undertake has often been under-acknowledged, and doctors have not been explicitly taught to teach as an undergraduate. In the past few decades, however, there has been a radical shift towards defining learning outcomes for all stages of medical education (Allan 1996; Harden *et al.* 1999a; Harden 2002a), as a way of describing the core content to be learned and with which to align teaching, learning and assessment. Learning outcomes have been developed and disseminated for undergraduate medical curricula by international networks (WFME 2003; Cumming and Ross 2008), government bodies (DOH *et al.* 2003), regulatory or professional organisations (GMC 2009b; Association of American Medical Colleges 1998; Frank 2005), healthcare organisations (NHS 2008), regional academic networks (Simpson *et al.* 2002), undergraduate student organisations (BMA-MSC 2005; Hilgers and De Roos 2007; Rigby 2007) and local institutions (Palés *et al.* 2004; Newble *et al.* 2005). These increasingly include learning outcomes relating to learning to teach (e.g. GMC 2010d; GMC 2009a; Frank 2005; Cumming and Ross 2008; Hilgers and De Roos 2007). This thesis focuses on one such outcome.

The General Medical Council (GMC) is the official regulatory body for doctors at all stages of training and practice in the UK, and is responsible for accrediting and regularly re-accrediting UK medical schools with the right to award medical degrees (GMC 2011b). GMC requirements for undergraduate medical education are encapsulated in a publication called '*Tomorrow's Doctors*', which since 2003 required medical graduates to "Be able to demonstrate appropriate teaching skills" and "Be willing to teach colleagues and to develop their own teaching skills" (GMC 2003, p5, Curricular Outcomes 8a & 8b). The most recent edition, published in 2009, went further in requiring all new medical graduates to be able to "Function effectively as a mentor and teacher including contributing to the appraisal, assessment and review of colleagues, giving effective feedback, and taking advantage of opportunities to develop these skills" (GMC 2009b, p27). The roles of 'mentor' and 'teacher' are increasingly distinguished in the medical education literature (Taherian and Shekarchian 2008; Stenfors-Hayes *et al.* 2011b; Stenfors-Hayes *et al.* 2010b), so this can be considered as a combination of two separate learning outcomes – to 'Function effectively as a mentor', and to 'Function effectively as a teacher'. This thesis focuses on the latter, considering mentoring only where it has been highlighted in the literature or by research participants as fulfilling part of the requirement to function effectively as a teacher.

The research problem

The GMC (2009b, p5) state that medical graduates "Must be able to demonstrate all the outcomes in *Tomorrow's Doctors* in order to be properly prepared for clinical practice and the Foundation Programme… The outcomes set out what the GMC expects medical schools to deliver and what the employers of new graduates can expect to receive". The ability to 'Function effectively as a teacher' is therefore a mandatory requirement for all new medical graduates in the UK, and medical schools

are expected to 'deliver' appropriate teaching, learning opportunities and assessment to ensure this is achieved. Whilst it could be argued that some medical students might learn to teach through extracurricular activities, such learning is inevitably variable and could not be relied upon by medical schools to ensure all students can function effectively as a teacher by the time they graduate. It could also be argued that teaching is largely intuitive and may not need to be learned at all, as in the paradigm of 'Teaching as a common-sense activity' identified by Squires (1999, pp3-6). However, in keeping with the bulk of the education literature, the GMC does not share this paradigm. Instead they write, "If you are involved in teaching you must develop the skills, attitudes and practices of a competent teacher" (GMC 2006, p14), and that "Everyone teaching or supporting students must themselves be supported, trained and appraised" (GMC 2009b, p61).

Although it is clear that the GMC require new medical graduates to be able to function effectively as a teacher, they offer no additional detail or explanation regarding what precisely medical graduates need to be able to do, nor what teaching they might be expected to deliver following graduation, nor any guidance or suggestions as to the process of how medical students might learn to do this as part of the undergraduate medical curriculum. Additionally, as the statement is very broad, and no rationale or evidence from the literature is provided to explain why it has been included in *Tomorrow's Doctors*, there is considerable potential for different interpretations as to its meaning and intended scope. Unlike most other General Medical Council requirements, there is also very little evidence in the literature that any UK medical school has engaged systematically with this learning outcome by ensuring all of their graduates develop and are formally assessed on their ability to teach (Nestel and Kidd 2005).

Purpose of this research

This research sought to explore different perspectives on the meaning and implications of the requirement for all UK medical graduates to be able to '*Function effectively as a teacher*', and consequently on what medical students need to learn as part of the undergraduate medical curriculum. Taken at face value, it requires all new UK medical graduates to be able to teach effectively. Teaching is, however, a very complex and multi-faceted activity and the word can mean very different things in different contexts (Squires 1999). Further exploration is required to ascertain what this means in the context of the undergraduate medical curriculum, precisely what they need to be able to do in relation to teaching, and subsequently how this can be effectively achieved and demonstrated. In the terminology of 'outcome-based education', it requires the definition of more detailed core learning outcomes to which teaching, learning and assessment can be constructively aligned (Harden *et al.* 1999b; Biggs and Tang 2009; Harden 2002b). Such detailed learning outcomes would typically be presented in the medical education literature in a structured hierarchical 'framework' below the overarching outcome '*Function effectively as a teacher*'. No ideal or 'gold standard' method of developing such detailed learning outcomes has been defined however, and many approaches in the literature have relied heavily on individual opinions or contexts (Dunn *et al.* 1985). The potential benefits of research-informed approaches to learning outcome development involving multiple stakeholder groups and triangulation of findings are increasingly

recognised however (Dunn *et al.* 1985; Cumming and Ross 2007b), and this drive has led to the current research.

Aims of this research

Specifically the three aims of this research were:

To explore what learning about teaching as part of the undergraduate medical curriculum means in the UK context.

To seek a range of perspectives on core learning outcomes in teaching for UK undergraduate medical curricula, and to consider potential influences on these perspectives.

To synthesise the findings and consider whether they could be used to develop a research-informed framework of core learning outcomes in teaching for UK undergraduate medical curricula.

Researcher motivation for this research

I work as a Fellow in Medical Education at The University of Edinburgh with responsibility for the MSc in Clinical Education, a number of research projects, and aspects of faculty and curriculum development for the undergraduate medical programme, including providing opportunities for medical students and junior doctors to teach. I studied medicine at The University of Edinburgh, then undertook five years of postgraduate training for general practice (GP) in various local hospital and primary care posts. I completed my postgraduate training in 2003 and have continued to work one day per week as a GP since then. One of the larger research projects I have been involved in recently was the EU-funded Tuning (Medicine) project within the MEDINE Thematic Network, which sought Europe-wide consensus on core learning outcomes for undergraduate medical curricula (Cumming and Ross 2008; Cumming and Ross 2007b; MEDINE website 2007). There was a high degree of consensus on many of the learning outcomes, including the '*Ability to teach others*', amongst medical academics, graduates and students. I am now also leading a related research project seeking Europe-wide consensus on core learning outcomes for the Bachelor of medicine (Bologna first cycle) degree, within the MEDINE2 Thematic Network (MEDINE2 website 2011). These projects have been challenging but enjoyable, and have made me question to what level of detail consensus on such learning outcomes could be achieved. This thesis could be seen as an in-depth case study following the original Tuning (Medicine) project to explore how far the research could be taken for a single learning outcome in a single country.

I am also currently leading part of a national project to define core competencies in teaching for consultants and general practitioners working in Scotland who are involved in teaching (Scott 2011), which has led to reflection and about teaching competencies for postgraduate trainees and for new medical graduates. I also jointly led another recent project exploring the teaching undertaken by those involved in delivering undergraduate medical education. This led to the development of a framework of undergraduate medical teaching activities and a new model of learning and teaching (Ross and Stenfors-Hayes 2008b; Ross and Stenfors-Hayes 2008a), and subsequently to exploration of other aspects of the learning and teaching model (Ross and Stenfors-Hayes 2009), and application of the findings to local faculty development. Aspects of these projects will be drawn upon later in this thesis.

I have been thinking about medical students learning to teach since 2003 when I started working for The University of Edinburgh and was given responsibility for meeting what was at that time a new GMC requirement that medical students should learn to teach (GMC 2003). Since then I have sought to create opportunities within the undergraduate medical programme for all medical students to gain some practical experiences in teaching, principally through the 'PAL (Peer Assisted Learning) Programme' (e.g. Ross *et al.* 2005; Ross and Cameron 2007; Ross and Cumming 2009; Ross *et al.* 2006; Ross 2004). The programme consists of one introductory lecture on learning to teach and numerous peer and near-peer teaching projects for students. This programme has in many ways been successful, but participation remains voluntary with variable uptake and no assessment of students on their teaching abilities. Training and evaluation vary depending on the project undertaken, teaching opportunities are typically brief, and the student experience varies considerably. For example, although there are more than enough places for all 260

fourth year students to teach in a project, a recent local survey found that only two thirds of the year had taken up this opportunity, many of whom had participated in more than one project.

It has become increasingly apparent that we are not fully meeting the GMC requirement to ensure all medical graduates to be able to 'Function effectively as a teacher' in Edinburgh, and this situation is reflected in most other medical schools across the UK. The GMC regularly review medical schools to ensure the requirements of *Tomorrow's Doctors* are being met (GMC 2011b), and when reviewing the Edinburgh undergraduate medical programme in 2008 observed that:

> "The School aims to ensure all students understand the basic principles of peer assisted learning (PAL). This begins with an introductory lecture in Year 1 and all students are offered at least one opportunity to deliver teaching to their peers by the end of Year 4. Year 3 students we met were positive about the teaching they had received from Year 4 students. Year 5 students reported that there is also an opportunity to teach peers at voluntary clinical skills sessions at the clinical skills laboratory. We note that participation is largely voluntary and encourage the School to expand and develop these programmes." (GMC 2008, p9).

The GMC have not offered any further guidance about precisely how they think the programme could or should be expanded and developed. Currently there are no more detailed learning outcomes in teaching for UK undergraduate medical curricula, nor reports in the literature of any other UK programme which has fully addressed these issues to act as an exemplar. It therefore seemed timely to study and hopefully shed some light on this under-researched area.

Audience for this research

The primary audience for this research are those responsible for delivering undergraduate medical education in the UK, because most do not currently appear to be meeting the GMC requirement for medical graduates to be able to teach. It is likely that some educators would prefer to leave the situation deliberately vague (Harden 2007b; Morcke and Eika 2009). Ensuring medical graduates can 'Function effectively as a teacher' is unlikely to be a straightforward process, and could lead to additional work and cost. The GMC (2009b, p6) acknowledge this, stating "We realise that meeting these outcomes and standards will be challenging. There are implications for resources and priorities both for medical schools and for the health service".

Medical students will find this research of interest because they are required by the GMC to learn, and be able to demonstrate that they are able, to 'Function effectively as a teacher', despite no clear guidance on how to do. In application forms and interviews for Foundation and Specialist Training programmes, particularly for the highly-competitive 'academic' training posts, medical students and junior doctors are frequently asked to describe and reflect upon their teaching experiences. This research will offer them a detailed exploration of what is currently expected of them in relation to teaching. It will also offer a range of perspectives, approaches and examples which will hopefully enable them to take advantage of opportunities to

develop their teaching, reflect upon and describe their teaching experiences, and formally demonstrate their teaching abilities.

It is anticipated that the GMC will be interested in this research, and that the findings might inform its approach to quality assurance and re-accreditation of UK medical schools based on the implementation of this component of *Tomorrow's Doctors*. It could also inform development of the fourth version of *Tomorrow's Doctors*. Those responsible for postgraduate medical training programmes may also find it useful and informative.

This research will hopefully also be of interest to those involved in undergraduate medical education outside the UK and those involved in teaching other non-medical disciplines. Tuning (Medicine) established a general consensus across Europe that all graduates in medicine should have the '*Ability to teach others*' (Cumming and Ross 2008, p17), but did not explore what this means however, or how it can be achieved in practice. Similar issues relating to medical students learning to teach can also be found in the medical education literature from outside Europe (Sobral 1989; Bardach *et al.* 2003; Pasquale and Cukor 2007; Pasquale and Pugnaire 2002). There also seems to be a growing interest for other healthcare students to learn to teach, for example in nursing and dentistry (Morris and Turnbull 2004; Bibb and Lefever 2002). With these other groups in mind therefore, particular care has been taken in writing this thesis to provide detailed contextual background to the research to facilitate transfer of the findings to other countries and disciplines (as recommended by Merriam 2009).

Anticipated contribution to the literature

This thesis seeks to contribute to the literature by providing academic scholars, curriculum developers, teachers and students involved in the undergraduate medical curriculum, a range of perspectives and insights on what it means to learn about teaching as part of the undergraduate medical curriculum. It also seeks to offer a range of perspectives on detailed learning outcomes in teaching, which can be subsequently debated, prioritised and addressed. By reviewing and synthesising the existing literature and then gathering original research data to address gaps identified in the literature, this thesis seeks to present the current evidence-base for a research-informed framework of detailed core learning outcomes relating to learning about teaching for the UK undergraduate medical curriculum, and a solid foundation for further scholarly research in this area.

Structure of this thesis

In this chapter the research problem has been described and the aims and purpose of the current research defined. The motivation behind the research has been presented, and the diverse audiences it speaks to and the contribution it seeks to make to the literature have been discussed.

Chapter 2 presents a review and synthesis of the literature relating to learning about teaching as part of the undergraduate medical curriculum. The review was undertaken in a structured manner by formulating and addressing the question '*What does learning about teaching as part of the undergraduate medical curriculum mean, and what perspectives on core learning outcomes can be gained from review of the literature?*' Attempting to address this question using the existing literature highlighted a number of gaps in existing knowledge. These gaps are described and the need for the current research outlined. The chapter concludes with the formulation of research questions to be addressed by data collection.

Chapter 3 presents the methodology and methods used in this research, demonstrating how these align with the research questions articulated in Chapter 2. The three principal methods of data collection used in the research are then outlined. These were a Delphi study with experts in medical education, interviews with recent medical graduates, and focus group interviews with current medical students. The methods used to compare and synthesise these three sets of data are then outlined, followed by consideration of alternative approaches, issues of trustworthiness, research ethics and reflexivity on the influence of the researcher on all aspects of this thesis.

Chapter 4 presents results from the three data collection methods, first separately and then together for comparison and synthesis. The combined results are used to demonstrate how they address each of the research questions.

Chapter 5 presents a discussion, interpretation and critique of the results of data collection, relating them to the gaps in the literature identified in Chapter 2 and the aims of this research. It then critically reflects on the methodological approach, the limitations of this research, and the contribution this thesis makes to knowledge and to the literature.

Chapter 6 presents a concluding summary of the thesis with discussion of the implications for practice.

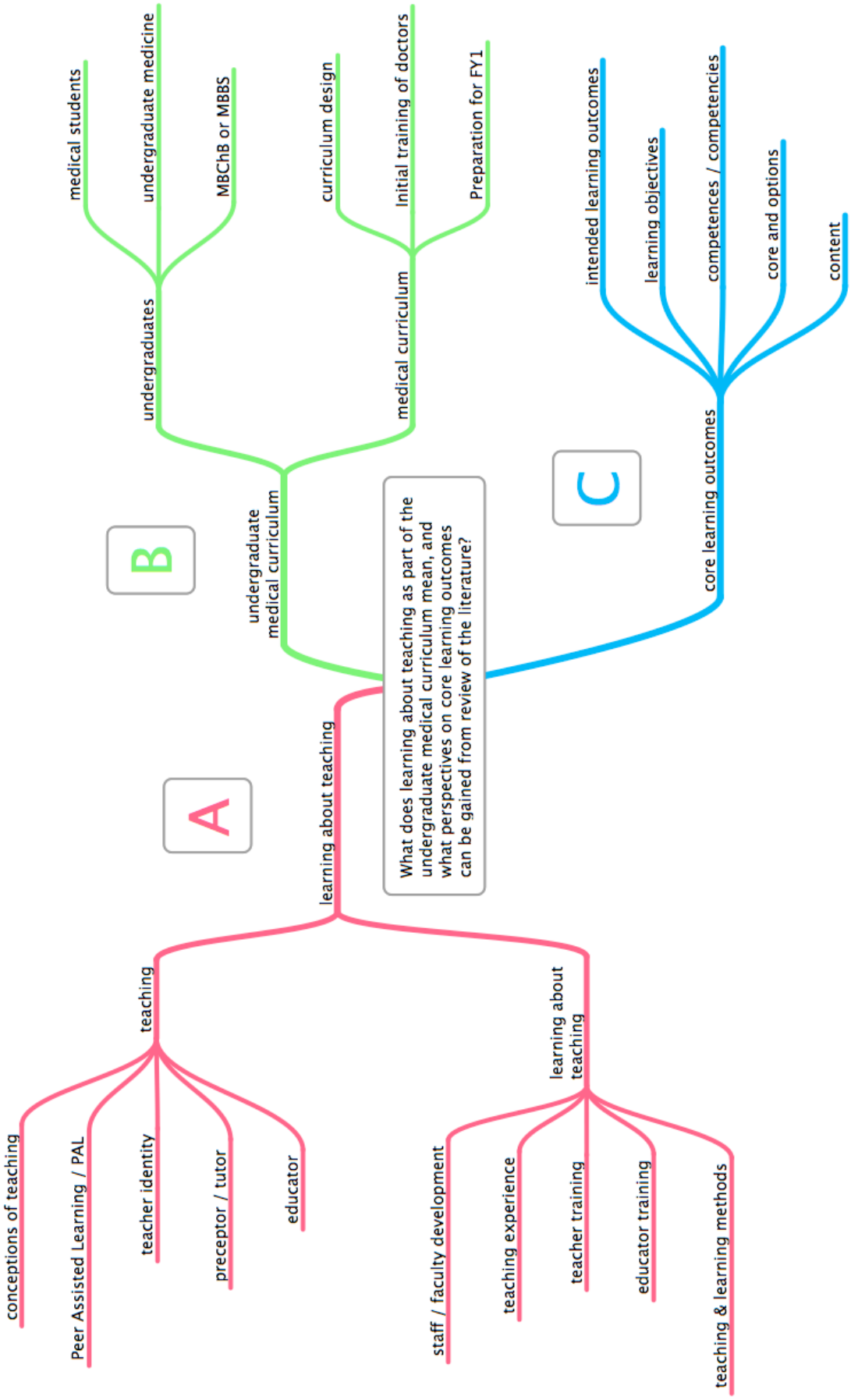
(this page is intentionally blank)

Chapter 2: Literature Review

Overview

This chapter reports a structured and systematic review of the literature undertaken with the aim of identifying, critiquing and synthesising literature related to learning about teaching as part of the undergraduate medical curriculum, and is somewhat more structured than typically found in qualitative research studies (Merriam 2009). It was undertaken in response to the following question derived from the research aims: '*What does learning about teaching as part of the undergraduate medical curriculum mean, and what perspectives on core learning outcomes can be gained from review of the literature?*'. This question was separated into three key topics: learning about teaching, the undergraduate medical curriculum, and core learning outcomes. These components and associated terms have been labelled A, B and C respectively and have been used to structure this review and chapter into nine parts (Figure 2.1). Part 1 reports a systematic search for medical education literature on core learning outcomes in teaching for the undergraduate medical curriculum (topics A + B + C together). Because a lack of literature was identified which related to all three of these topics together, topics were also explored individually and in pairs and then synthesised to address the research aims and literature review question. Part 2 explores non outcomes-based literature relating to learning about teaching as part of the undergraduate medical curriculum (topics A + B), and Part 3 other literature on core learning outcomes in teaching (topics A + C). Literature relating to each key topic is explored individually in Parts 4 (learning about teaching - topic A), 5 (the UK undergraduate medical curriculum - topic B), and 6 (core learning outcomes - topic C). Part 7 explores the literature on core learning outcomes for the undergraduate medical curriculum (topics B + C). Gaps in the literature identified in Parts 1 to 7 are highlighted with bold underlined text. Part 8 attempts to address the aims of this research by synthesising the existing literature relating to core learning outcomes in teaching for the undergraduate medical curriculum (topics A + B + C), summarising the gaps identified in the literature and situating the current research. Finally, Part 9 formulates these gaps as research questions to be addressed by data collection.

Figure 2.1 – Literature review question and key topics



1. Literature on core learning outcomes in teaching for the undergraduate medical curriculum (topics A+B+C)

Method for the systematic literature search

The approach used to search the literature was based on the method of systematic searching for evidence in medical education described by Haig and Dozier (2003), involving the following steps:

Step 1 – Defining the review question

As recommended in the 'Best Evidence Medical Education' guide on systematic searching for evidence in medical education (Haig and Dozier 2003), and adopted in subsequent systematic reviews (Steinert *et al.* 2006; Hammick *et al.* 2010), the aims of the literature review were formulated as a question as indicated above.

Step 2 – Identifying and expanding key topics

Three key topics were identified in the literature review question. One of which, 'learning about teaching', was further broken down into 'teaching' (the outcome - what students will learn to do), and 'learning about teaching' (the process of learning about it). Reflection on these key topics, together with careful study of relevant articles and associated keywords as they were identified, led to the expansion of these topics and related terms, detailed in Figure 2.1.

Step 3 – Deciding the scope of the search & inclusion criteria

The scope of the search was to identify all articles relating to core learning outcomes in teaching for the undergraduate medical curriculum. Three bibliographic databases were selected – MEDLINE, ERIC and EMBASE – on the basis of perceived relevance and use in previous systematic reviews in medical education (Steinert *et al.* 2006). All available years were searched up until July 2011 (from 1948, 1966 and 1980 respectively). The search was limited to articles published in English, but included all article types and countries of origin. The same criteria were used to search Google Scholar, and to hand search the preceding five years of the most relevant journals. The references and keywords of all articles which met the inclusion criteria were also used to help identify other potentially relevant articles.

Step 4 – Searching the databases

A search was conducted in each of the three databases based on the expanded literature review question in Figure 2.1. Relevant Subject Headings ('/' in MEDLINE and EMBASE) and Keywords ('.mp' in MEDLINE and EMBASE, '.KW' in ERIC) were identified and used where possible. Multiple searches were undertaken in each database using all the alternative terms. An example search strategy used in EMBASE is displayed in Figure 2.2. In this example the Subject Heading 'undergraduate medicine' was only associated with 39 articles, whereas the more inclusive term 'medical students' (subject heading plus keyword search) was associated with 37,187 articles. Combining these with similarly inclusive search terms for topics A and C identified 52 potentially relevant articles. Many of these inclusive terms were also used for searching Google Scholar. Hand searching journals over the preceding five years of relevant journals was undertaken with

printed copies of Medical Education, Medical Teacher and The Clinical Teacher, and online versions of Academic Medicine, Teaching and Learning in Medicine, BMC Medical Education, and Advances in Health Sciences Education.

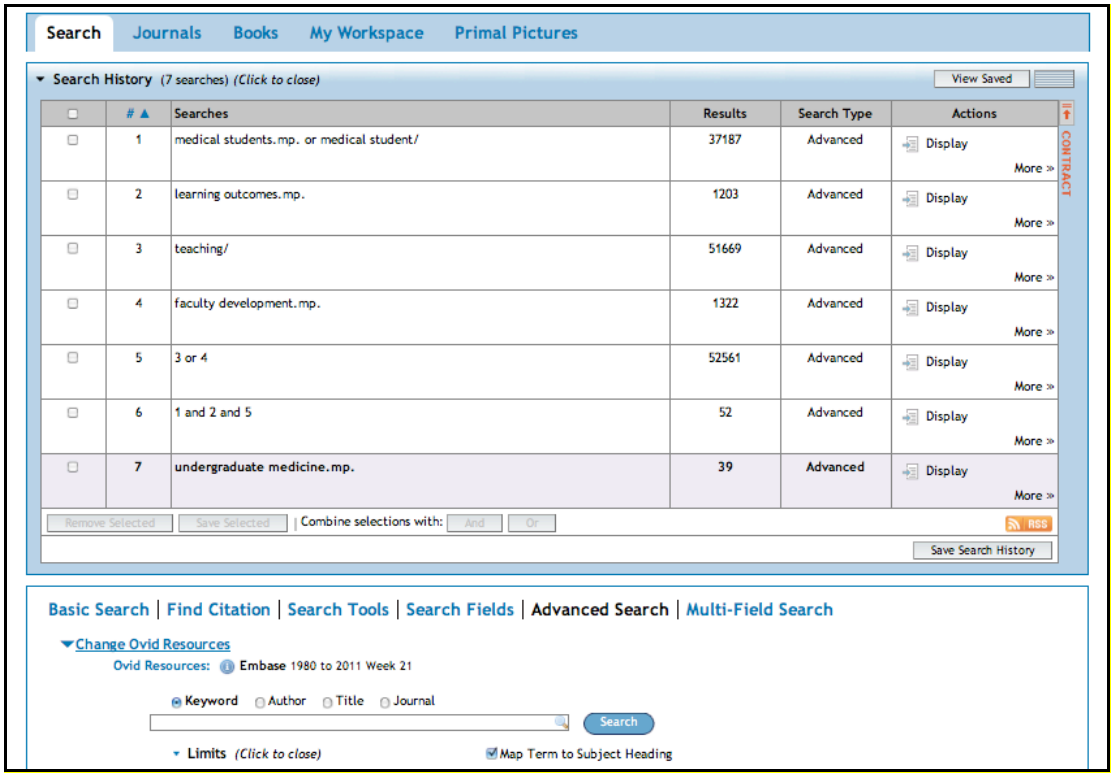


Figure 2.2 – Example search strategy in EMBASE (accessed 31st May 2011)

Step 5 – Selecting articles for inclusion

Articles were selected if they explicitly related to all the three key topics of the literature review (A+B+C in Figure 2.1). Many of the articles identified from the database and hand searches could be excluded by reading the title, but where there seemed any possibility of relevance the full abstract was read. All potentially relevant articles were printed and read in full and a judgement was made as to whether or not the inclusion criteria were met.

Step 6 – Analysing the articles and collating learning outcomes

Articles selected for inclusion were re-read in full and any existing or suggested learning outcomes in teaching (or learning objectives, content, topics to learn, or competencies to acquire) were identified, compared and tabulated. Some of these learning outcomes were paraphrased, synthesised or reworded as learning outcomes.

Findings of the systematic literature search

Many articles were identified which stated that medical students should learn about teaching as part of the undergraduate medical curriculum, but offered no further detail with regard to what precisely they should learn. The Tuning (Medicine)

Project, for example, identified strong consensus that European medical graduates should have the "Ability to teach others" (Cumming and Ross 2008). Teaching was also highlighted as one of nine domains of the undergraduate 'European Core Curriculum' proposed in 2006 by a collaboration of student associations (Hilgers and De Roos 2007; Rigby 2007). They state that "Graduates should be able to teach colleagues, students, other healthcare providers, patients and their relatives, communities and society at large" (Hilgers and De Roos 2007, p274). Many other articles also suggested that students want to learn more about teaching as part of the undergraduate medical curriculum (Shariq 2011; Smith *et al.* 2007; Andreatta *et al.* 2009). Some articles were also identified which described elective courses in teaching for medical students but did not include details of the intended learning outcomes (e.g. Sobral 1989). Many articles were also identified in the Peer Assisted Learning (PAL) literature which focused on preparing students to undertake their role as a PAL tutor (e.g. Bulte *et al.* 2007), but did not explicitly relate this to learning to teach and preparing them to teach after graduation. Specific examples included preparation for tutoring patient-centred interviewing skills (Nestel and Kidd 2002), practical procedures (Weyrich *et al.* 2009; Salerno-Kennedy *et al.* 2010), and to act as examiners (Morrison *et al.* 2003). Some of this PAL literature is explored in Part 2.

Detailed learning outcomes related to teaching

Fifteen articles were identified which met the inclusion criteria of the literature review and defined or suggested detailed learning outcomes in teaching for the undergraduate medical curriculum. Learning outcomes from each of these documents were identified, compared and synthesised into a single list (Table 2.1). These included *Tomorrow's Doctors* itself (GMC 2009b, p27), a literature review entitled 'Why medical students should learn how to teach' (Dandavino *et al.* 2007), eight elective courses in teaching for senior medical (Pavia *et al.* 1982; Craig and Page 1987; Pasquale and Pugnaire 2002; Bardach *et al.* 2003; Blatt and Greenberg 2007; Pasquale and Cukor 2007; Smith *et al.* 2007; Andreatta *et al.* 2009), two articles about a mandatory week-long teacher training course for sixth year medical students associated with an elective course (Zijdenbos *et al.* 2011; Ten Cate 2007), a survey of medical students in a university in the United States (Bing-You and Sproul 1992), the student association 'European Core Curriculum' highlighted above (Hilgers and De Roos 2007), and a survey of all medical schools in the United states (Soriano *et al.* 2010).

Learning Outcomes *On successful completion of a UK undergraduate medical programme graduates will be able to:*	GMC 2009b	Dandavino *et al.* 2007	Pavia *et al.* 1982	Craig & Page 1987	Pasquale & Pugnaire 2002	Bardach *et al.* 2003	Blatt & Greenberg 2007	Pasquale & Cukor 2007	Smith *et al.* 2007	Andreatta *et al.* 2009	Zijdenbos *et al.* 2011	Ten Cate 2007	Bing-You & Sproul 1992	Hilgers & De Roos 2007	Soriano *et al.* 2010
Contribute to the appraisal of colleagues	✔														
Contribute to the assessment and review of colleagues / peers	✔										✔				
Provide appropriate and effective feedback to learners	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔		✔

Learning Outcomes *On successful completion of a UK undergraduate medical programme graduates will be able to:*	GMC 2009b	Dandavino *et al.* 2007	Pavia *et al.* 1982	Craig & Page 1987	Pasquale & Pugnaire 2002	Bardach *et al.* 2003	Blatt & Greenberg 2007	Pasquale & Cukor 2007	Smith *et al.* 2007	Andreatta *et al.* 2009	Zijdenbos *et al.* 2011	Ten Cate 2007	Bing-You & Sproul 1992	Hilgers & De Roos 2007	Soriano *et al.* 2010
Take advantage of opportunities to develop teaching skills	✔														
Describe how the principles of adult learning theory applies to teacher-student interactions		✔					✔		✔						✔
List the components of effective teaching		✔													
Identify and demonstrate strategies required for lifelong learning		✔													
Communicate about teaching with colleagues		✔										✔	✔		
Select and use appropriate teaching strategies and methods		✔	✔		✔			✔		✔		✔		✔	
Facilitate self-directed learning in others		✔							✔						
Recognise the importance of their role as a teacher		✔						✔							
Teach with satisfaction and minimal anxiety		✔													
Demonstrate understanding of the principles of teaching & learning		✔										✔	✔	✔	
Describe different learning styles		✔			✔										
Recognise the importance of learning environment and climate		✔				✔			✔						
Lecture and present material to a group		✔	✔		✔					✔	✔		✔		
Facilitate a small group		✔			✔					✔	✔				✔
Tutor one-to-one		✔													
Teach in a clinical environment		✔	✔						✔				✔		
Teach physical examination or procedural skills		✔					✔			✔			✔		✔
Design an educational module or session *[includes 'instructional design']*			✔	✔		✔				✔		✔	✔		
Assess student performance or participation fairly *[includes 'Evaluate..']*			✔			✔	✔					✔			
Write useable test items			✔									✔			
Conduct a search of the medical education literature			✔												
Demonstrate effective teaching behaviour				✔									✔		
Review and evaluate video recordings of their own teaching				✔									✔		
Assess prior learning & student learning needs					✔			✔				✔			
Establish and communicate the goals and objectives of teaching					✔			✔	✔						
Evaluate teaching					✔				✔	✔					

Learning Outcomes *On successful completion of a UK undergraduate medical programme graduates will be able to:*	GMC 2009b	Dandavino *et al.* 2007	Pavia *et al.* 1982	Craig & Page 1987	Pasquale & Pugnaire 2002	Bardach *et al.* 2003	Blatt & Greenberg 2007	Pasquale & Cukor 2007	Smith *et al.* 2007	Andreatta *et al.* 2009	Zijdenbos *et al.* 2011	Ten Cate 2007	Bing-You & Sproul 1992	Hilgers & De Roos 2007	Soriano *et al.* 2010
Undertake 'microprecepting'					✔										
Use technology (AV/IT/web) in teaching					✔								✔		
Recognise 'teachable moments'						✔									
Take a leadership role in a teaching situation								✔	✔	✔			✔		✔
Align teaching, learning and assessment with learning needs								✔							
Develop their own identity as a teacher								✔							
Moderate and maintain control of a teaching session									✔	✔	✔				
Plan and implement an educational project									✔						
Identify barriers to educational change									✔						
Teach in a way that promotes understanding and retention									✔						
Demonstrate a basic understanding of educational psychology and motivation										✔	✔	✔			
Teach using simulation and standardised patients										✔					
Demonstrate reflective teaching practice										✔			✔		
Demonstrate understanding of the principles of assessment										✔				✔	
Demonstrate understanding of the principles of programme administration										✔					
Demonstrate understanding of the principles of educational research										✔					
Use the 'set-dialogue-closure' format in teaching											✔				
Basic acquaintance with medical education topics and the literature											✔	✔			
Describe the current curriculum philosophy												✔			
Teach students, helping to guide their learning												✔		✔	
Identify emotional signals from students												✔			
Collaborate with teaching colleagues												✔			
Seek and respond to feedback on your teaching, and be able to handle criticism												✔			
Teach in a confident, enthusiastic and motivated manner												✔			
Teach with integrity and be able to securely handle confidential information												✔			
Adequately prepare for teaching												✔			
Teach problem-solving													✔		
Teach at the bedside and in ward rounds													✔		

Learning Outcomes *On successful completion of a UK undergraduate medical programme graduates will be able to:*	GMC 2009b	Dandavino *et al.* 2007	Pavia *et al.* 1982	Craig & Page 1987	Pasquale & Pugnaire 2002	Bardach *et al.* 2003	Blatt & Greenberg 2007	Pasquale & Cukor 2007	Smith *et al.* 2007	Andreatta *et al.* 2009	Zijdenbos *et al.* 2011	Ten Cate 2007	Bing-You & Sproul 1992	Hilgers & De Roos 2007	Soriano *et al.* 2010
Demonstrate effective questioning skills													✔		
Select appropriate assessment methods for the situation, group or person														✔	
Teach colleagues (same profession/ stage)														✔	
Teach other healthcare providers														✔	
Teach around a 'case'															✔
Teach with patients															✔
Supervise medical students care of patients															✔

Table 2.1 – Learning Outcomes in teaching for undergraduate medical curricula identified in the systematic literature search, in sequential order by article

Reflections on the systematic literature search

Only fifteen articles were identified which met the inclusion criteria, although many more were found which support the broad overarching learning outcome that medical graduates should be able to teach. Most of these were identified through hand searching and from reference lists of relevant papers rather than through database searching, which was complicated by inconsistent use of terminology and ambiguous database subject headings. Searching for articles with the free text, heading or keywords 'teaching', 'medical student' and 'learning outcome' identified large numbers of articles on teaching medical students about unrelated content. Sixty-four detailed learning outcomes in teaching were identified from the fifteen articles, with considerable variation in the learning outcomes suggested be each (Table 2.1). There was a majority consensus on only one learning outcome, with thirteen articles suggesting that medical students should '*Provide appropriate and effective feedback to learners*'. Seven articles suggested they should '*Select and use appropriate teaching strategies and methods'*, and six that they should '*Lecture and present material to a group*' and '*Design an educational module or session*'. Five articles suggested they should '*Facilitate a small group*', '*Teach physical examination or procedural skills*' and '*Take a leadership role in a teaching situation*'. Four articles suggested they should '*Describe how the principles of adult learning theory applies to teacher-student interactions*', '*Demonstrate their understanding of the principles of teaching and learning*', '*Teach in a clinical environment*', and '*Assess student performance or participation fairly*'. Of the remaining learning outcomes, seven were suggested by three articles, twelve by two articles, and 33 by only one article. It may be possible to further synthesise some of these learning outcomes, however the review suggests that that there is very little consensus about these and **there is insufficient data in the existing literature for the development of a research-informed framework of core learning outcomes for UK undergraduate medical education.**

2. Learning about teaching as part of the undergraduate medical curriculum (topics A+B)

The literature suggests that medical students already learn content related to teaching as part of the undergraduate medical curriculum. Some of this is explicitly related to teaching and may be labelled as such, some is learned through role modelling and the experience of being taught, but perhaps the majority is learned primarily to address learning outcomes in other subject areas such as clinical communication and patient education. This section explores the literature in each of these areas.

Medical students explicitly learning about teaching

Many medical students already explicitly learn about teaching and have opportunities to practise and receive feedback on their teaching during their undergraduate education. For most this will take the form of a 'Peer Assisted Learning' (PAL) initiative in which medical students tutor or teach their peers and thus gain some insight and experience of teaching, although some students may also have the opportunity to participate in more formal training in teaching.

Courses and training in teaching

A small number of articles in the literature report elective courses in teaching for medical students, typically of around one week duration towards the end of the undergraduate medical programme (Sobral 1989; Pasquale and Pugnaire 2002; Bardach *et al.* 2003; Craig and Page 1987; Pavia *et al.* 1982; Blatt *et al.* 2000; Pasquale and Cukor 2007; Centeno *et al.* 2001). Only one example of a mandatory course in teaching for all medical students was identified in the literature. This was a one-week course in the sixth year of the medical programme at the University of Utrecht (Ten Cate 2007; Zijdenbos *et al.* 2011).

Practical experience of teaching (Peer Assisted Learning)

There is an extensive body of literature which supports the value of learning complex activities by experience and deliberate practice (Van de Wiel *et al.* 2011; Kolb 1984). Teaching is a very complex activity, therefore one might assume that in order to learn to teach students would require opportunities to teach. Many medical students already do gain some practical experience of teaching as part of the undergraduate medical curriculum – typically in the form of various 'Peer Assisted Learning' (PAL) initiatives (Ross and Cumming 2009; Ross and Cameron 2007). Peer Assisted Learning can be defined as "People from similar social groupings who are not professional teachers helping each other to learn and learning themselves by teaching" (Topping 1996, p322). Many PAL initiatives described in the medical education literature involve some training for tutors (Pasquinelli and Greenberg 2008), although these may not be representative. In a recent survey of United States medical schools, all respondents (representing 99 of the 130 medical schools invited) said that medical students made 'significant teaching contributions' in their programmes, but only 44% said they offered a formal training programme in teaching (Soriano *et al.* 2010). When asked what preparation and training PAL tutors should have, the participants of one study suggested they learn "How to guide a group and take control of the teaching session", "To what extent the content of the

lessons should be prepared versus interactive discussion", "How to deal with questions and problems, especially if the near-peer cannot answer them during the lesson", "How to handle 'difficult' students (e.g. unmotivated, dominant, impolite)", and "How to optimize the group learning process" (Bulte *et al.* 2007, p589). There is some evidence that participation in PAL can enhance interest and enthusiasm for teaching, as well as helping students develop teaching skills and reinforce their learning of the content being taught (Bardach *et al.* 2003; Chou 2005; Buckley and Zamora 2007). A more detailed exploration of Peer Assisted Learning (PAL) in undergraduate medical education can be found elsewhere (Ross and Cumming 2009; Ross and Cameron 2007), but is beyond the scope of the current research.

Medical students learning about teaching by being taught

It is estimated that a medical student at the University of Edinburgh, during their five years in the undergraduate programme, will be formally taught by around 500 university academics (many from the biomedical and behavioural sciences) and 300 NHS clinicians with honorary University contracts, and that this teaching will be supported by several thousand other NHS and administrative staff (Cameron and Ross 2008). The number of teachers involved in other UK undergraduate medical programmes is not currently available in the literature, but are likely to be similarly large. The importance of role-modelling, both in terms of learning clinical practice and learning about teaching, is frequently emphasised in the literature (Harden and Crosby 2000; Weissmann *et al.* 2006; Cruess *et al.* 2008). It seems likely that medical students will inevitably learn something about teaching from the way in which they are taught. This may have undesirable as well as desirable effects, particularly if many of their teachers have had no formal training in teaching as is often the case with NHS clinicians currently. As Cruess *et al.* (2008, p721) warn, "Role modelling is a powerful teaching tool for passing on the knowledge, skills, and values of the medical profession, but its net effect on the behaviour of students is often negative rather than positive". They suggest that medical teachers should become 'intentional role models' by being aware of themselves as role models for students, protecting time to spend with students, and making a conscious effort to be explicit in the behaviour they seek to model. Such behaviours may relate to reflective practice, student-centred participatory teaching, ethical conduct, continuing professional development and being open to feedback and critique about their own teaching. Jones and colleagues, for example, developed an approach to help medical students learn about professionalism and communication skills by critically evaluating their teachers (Jones *et al.* 2004).

Medical students learning to 'teach' patients

Medical students explicitly learn to give patients an explanation of their symptoms and signs of illness, patterns of disease, investigation and treatment options, and to offer advice to patients on lifestyle changes, self-help measures, illness prevention, investigation, referral and treatment (Tate 2002; Aspegren 1999; von Fragstein *et al.* 2008). Students are typically assessed in their ability to give such explanation and advice to patients in simulated situations, which may include receiving feedback from faculty, peers and the patient (Wass and Archer 2011). As discussed in Chapter 1, these activities focus on individual patient needs with the aim of enabling patients to better manage their health and illnesses, and are quite different to teaching

healthcare professionals and students with the aim of helping them to develop their clinical knowledge and skills and thus deliver better patient care. The literature suggests that some of these skills, techniques and approaches, such as being able to explain concepts clearly and being learner-centred, are also relevant to learning about teaching, and that medical students learning about teaching may enhance patient care and patient health outcomes (Cohen and Dennick 2009).

Medical students learning other content related to teaching

There are numerous other aspects of the undergraduate medical curriculum which may be considered to help prepare medical students for teaching but are often not explicitly labelled as 'teaching' in the curriculum. Knowledge and skills in medical ethics, reflective practice, continuing professional development and even diagnosing and managing patients with stress and other mental illness may all have a place in helping prepare graduates to teach. As Evans *et al.* (2010, p231) write, "The skills that clinicians have developed for providing patient care are eminently applicable to the student or trainee in difficulty". Medical students learn to work with colleagues, to manage their time, to manage personal stress, and sometimes also learn to assess their peers formatively with feedback, summatively as part of 360° assessment, and to identify and address threats to patient safety from poor practice. They are typically required to search the literature, appraise and present research evidence relating to clinical practice in relation to 'Evidence Based Medicine' or 'Medical Informatics' (e.g. Cumming and Ross 2008; GMC 2009b), but such skills may be transferable to preparing material for teaching and to large group teaching. All UK medical students are taught and assessed on their communication skills (Aspegren 1999; von Fragstein *et al.* 2008), usually including communicating with patients, relatives and colleagues, communicating using spoken, written and electronic means, and communicating in difficult situations such as breaking bad news (GMC 2009b; Maguire and Pitceathly 2002). It may also include specialist techniques such as motivational interviewing (Prochaska and DiClemente 1983; Prochaska *et al.* 2001). There is now a substantial body of evidence in the medical education literature that such communication skills can be learned (Maguire and Pitceathly 2002; Aspegren 1999; Ong *et al.* 1995), and that appropriate attitudes towards communication can be nurtured (Neighbour 2004; Tate 2002). There are clear parallels between being able to communicate with patients in these ways and being able to communicate with students and other learners, and making such parallels more explicit may facilitate student transfer of learning between these roles (Evans *et al.* 2010).

3. Core learning outcomes in teaching (topics A+C)

A considerable number of other articles, books and guidance documents were identified in the literature which define teaching competencies for specific groups or learning outcomes for specific training programmes other than the undergraduate medical curriculum. Teaching competencies for qualified doctors, particularly recent graduates, would seem to most usefully provide a perspective on learning outcomes in teaching for the undergraduate medical curriculum. This section therefore begins by exploring the roles, responsibilities and identity of doctors who teach, describes a current project seeking consensus on core teaching competencies for all doctors involved in teaching in Scotland, then reviews existing literature on the teaching undertaken by recent medical graduates in the UK, and their roles, responsibilities and identity as teachers.

Roles, responsibilities and identity of doctors who teach

The GMC publication 'Duties of a Doctor' applies to all qualified doctors working in the UK. It states that "Teaching, training, appraising and assessing doctors and students are important for the care of patients now and in the future. You should be willing to contribute to these activities", and "If you are involved in teaching you must develop the skills, attitudes and practices of a competent teacher" (GMC 2006, p14). In an earlier publication entitled 'The doctor as teacher', the GMC (1999, p1) also stated that "All doctors have a professional obligation to contribute to the education and training of other doctors, medical students and non-medical healthcare professionals on the team". Guidance on the competencies required of doctors who teach, or on learning outcomes for faculty development of doctors, has also been issued by national government bodies, the NHS, Royal Colleges for each speciality, funding councils, academies, medical schools, postgraduate deaneries, course organisers and others. Many focus on particular groups of medical teachers depending upon speciality, stage of training, institutional association, whether they teach undergraduates or postgraduates, or whether they have specialist teaching roles such as 'clinical supervisor', 'pbl tutor' or 'directors of studies'. Approximately 15,000 doctors work for the National Health Service (NHS) in Scotland, and there are similar numbers elsewhere in the UK. Many of them have multiple undergraduate and postgraduate teaching responsibilities however, and are thus expected to fulfil multiple sets of competency requirements and can find these very confusing and difficult to address (NES 2007; Scott and Irvine 2010). Of the 2,246 respondents to a recent survey of Scottish consultants, 88% had a role in postgraduate medical education, 77% had a role in undergraduate medical education, 64% had a role in multiprofessional education, and 57% indicated that they "Did not have access to staff development for their educational roles or were unsure as to whether staff development was available" (NES 2007, p3). These multiple teaching roles and diverse competency requirements also creates difficulty for those responsible for ensuring consultants are appropriately trained for the teaching they deliver (Scott and Irvine 2010). Also because most of the guidance literature describes teaching competencies (UKFPO 2010; Molenaar *et al.* 2009; Tigelaar *et al.* 2004), or standards for teaching practice (AME 2009; HEA 2006), rather than learning outcomes for a particular programme of study, increasing emphasis is being placed on identifying and defining the roles, responsibilities and training needs of

individual teachers rather than a more generic 'one-size-fits-all' training package (Scott and Irvine 2010).

Generic competencies for all doctors who teach in Scotland

The 'Faculty Development for Scotland' project was launched in 2010 to address some of these issues and establish a core list of teaching competencies which should be demonstrated by all consultants and general practitioners involved in teaching in Scotland (Scott and Irvine 2010). The objective was "To prepare a faculty development plan for Scotland which joins together the requirements of undergraduate and postgraduate medical education supported by detailed programmes which meet the needs of the Medical Schools, PG Deaneries and the service" (Scott 2011, p1). The first stage involved review of the literature and identification of the key guidance documents relating to competencies for all doctors involved in teaching who work in Scotland. These were the GMC publications *Good Medical Practice* (GMC 2006), *The Trainee Doctor* (GMC 2011g), *Standards for curricula and assessment systems* (GMC 2010f) and *Tomorrow's Doctors* (GMC 2009b); the *UK Foundation Programme curriculum* (UKFPO 2010); the Academy of Medical Royal Colleges *Common competences framework for doctors* (AMRC 2009); the Academy of Medical Educators *Professional standards* (AME 2009); and the Higher Education Academy *UK Professional Standards Framework for teaching and supporting learning in higher education* (HEA 2006). Competencies from these documents were tabulated, synthesised and formulated as an online survey to determine their perceived importance by relevant stakeholders (Ross *et al.* 2011a). The survey is live at the time of writing, and the complete synthesised list of core competencies / learning outcomes, together with their sources, is reproduced in Appendix 1.

The identity of medical educators as teachers

The literature suggests that an individual's sense of identity as a teacher has a significant impact on their conception of teaching, and also to the way they approach their teaching and professional development relating to teaching (Kreber 2010). Not all doctors who teach identify themselves as teachers however. In an interview study with experienced medical teachers, Stone *et al.* (2002, p183) found that clinical teacher identity often developed over time, particularly in response to specific experiences, "The identity as teacher often began with a specific incident involving a learner and evolved as knowledge and expertise increased". Higgs and McAllister (2007, p195) found a similar transition in speech pathologists, "Clinical educators go through a transition where their identity as practitioners is replaced (and in many cases supplemented) by learning to teach and gaining a sense of being an educator in practice settings". Sometimes this awareness of the role of physician as teacher begins during medical school, particularly in relation to PAL activities (Harms Amorosa *et al.* 2011). The literature also suggests that medical teachers tend to compartmentalise their clinical, teaching and other roles depending on situation and context (Stenfors-Hayes *et al.* 2010a). They are often prioritised hierarchically however, so at certain times one role may take precedence over others, or several roles may be combined into a single complex identity (Monrouxe 2010). The literature also suggests that there may be optimal 'transition' stages in adult development when it may be easier for medical students and trainees to incorporate new aspects of their identity (Bell 1996). The broader literature on identity is extensive however, and beyond the scope of the current research.

Recent medical graduates as teachers

Recent medical graduates working in the UK health service are now explicitly expected to undertake teaching (UKFPO 2010). This section explores the responsibilities and roles of recent graduates with regard to teaching, then seeks to identify what kinds of teaching they may get involved in, and whether they see teaching as a formal part of their role as a junior doctor.

Teaching responsibilities and roles of recent medical graduates

Most graduates from UK undergraduate medical programmes go straight into postgraduate education to work as 'Foundation Year 1' ('FY1') doctors (NHS 2011b). This has replaced the previous 'Junior House Officer' ('JHO') year in the UK and is roughly equivalent to the first year of 'Residency' in the United States (Americal Medical Association 2011). The UK Foundation Programme Curriculum requires that an FY1 doctor "Undertakes teaching in under or post-graduate education in a one-to-one setting", "Assesses students and other non medical colleagues in training", and "Contributes to the assessment or review of students and other colleagues with whom they work" (UKFPO 2010, p36). All FY1 doctors then progress into 'Foundation Year 2' ('FY2') in which they are expected to further develop their teaching skills and must pass a 'Developing the clinical teacher' assessment involving observation, feedback and reflection on an episode of their teaching (UKFPO 2010). Surprisingly little has been written about the teaching undertaken by FY1 doctors however. One book chapter has recently been published which advises Foundation doctors how to learn about and gain experience in teaching (Morris 2011). However, no research findings were identified exploring the volume and types of teaching FY1 doctors are likely to become involved with, nor were there any examples of formal core training in teaching for FY1 doctors. Only a small number of articles were identified which relating to optional teaching initiatives for FY1 doctors, such as the South East Scotland Foundation Doctor Training Programme which involves training Foundation doctors to deliver specific tutorials in prescribing, bedside teaching and acute care to medical students at The University of Edinburgh. Participation in this programme is entirely voluntary, the training focuses on preparing Foundation doctors to deliver specific teaching sessions, and the training takes place several months after FY1s start work, by which time many of them have already been involved in other types of teaching (Rodrigues *et al.* 2008).

The undergraduate medical programme is increasingly viewed as 'preparation for practice' for working as an FY1 doctor and further training (Evans and Roberts 2006; Cave *et al.* 2007; Bleakley and Brennan 2011; Jones *et al.* 2002). A few examples of induction or 'transition' courses between graduation and taking up an FY1 post have been reported in the literature (e.g. Teo *et al.* 2011), but for most graduates there is no additional training before they start work. Although a recent survey of FY1 doctors who had graduated from Peninsula Medical School found the majority felt well prepared for 'Undertaking a teaching role' (Bleakley and Brennan 2011), no explanation is offered about why they felt well prepared, nor what teaching roles they had actually undertaken as an FY1. **Greater understanding of what teaching FY1 doctors are likely to undertake without additional training would facilitate**

the development of appropriate undergraduate learning outcomes in teaching and help ensure graduates are better prepared for practice.

Recent medical graduates' identity as teachers

A small number of opinion pieces in the literature suggest that UK FY1 doctors see teaching as part of their role (e.g. Tavabie and Baker 2011), although no formal studies of this have yet been reported. Studies in the United States and the Netherlands suggest that teaching is seen as part of the role of 'Residents' by residents themselves (Busari *et al.* 2000; Apter *et al.* 1988; Busari *et al.* 2002), their seniors (Busari *et al.* 2003), and the majority of medical students (Bing-You and Sproul 1992). Literature from the U.S. also suggests residents spend considerable amounts of time involved in teaching (Seely 1999), and want more training in teaching (Busari *et al.* 2002). Many examples of resident training initiatives in teaching can be found in the literature (Ostapchuk *et al.* 2010; Bharel and Jain 2005; James *et al.* 2006; Hill *et al.* 2009), as can some articles on assessing resident teaching skills (Morrison *et al.* 2002; Zabar *et al.* 2004), and 'tips for preparing residents as teachers' (Mann *et al.* 2007). 'Residents' in the United States, however, can be anywhere between one and seven years after graduation, and so these findings are not directly applicable to the UK. **There is a lack of literature relating to UK Foundation doctors' experiences of teaching, and a lack of research exploring whether they consider teaching to be part of their role or identity.**

4. Learning about teaching (topic A)

There is considerable evidence in the literature that individuals conceptualise teaching in many different ways. Young (2008, p41) writes, "Conceptions of teaching are idiosyncratic… largely unarticulated composites of individual teachers' assumptions, knowledge and beliefs about teaching and learning". Such conceptions have been shown to impact on the way teachers approach their teaching (Trigwell and Prosser 1996; Richardson 2005; Martin *et al.* 2000), which in turn has been shown to impact on student learning (Martin *et al.* 2000; Kember 1997; Entwistle 1988; Biggs and Tang 2009, Chapter 11; Vaughn and Baker 2008; Trigwell *et al.* 1999). There is some evidence that teaching conceptions can change over time (Kember 1997). Many faculty development strategies deliberately seek to influence participant conceptions of teaching for this reason (Ho *et al.* 2001; Åkerlind 2008; Bulik and Shokar 2007), with some evidence of success (Gibbs and Coffey 2009). One author even suggested that "Fundamental changes to the quality of teaching and learning are unlikely to happen without changes to lecturers' conception of teaching" (Kember and Kwan 2000, p469), although others would disagree (e.g. Devlin 2006). Several tools have been developed to measure teacher orientations to different conceptions of teaching, with probably the best-known example being the 'Teaching Perspectives Inventory' (Pratt *et al.* 2001), which has now been used many different contexts with large numbers of teachers (e.g. Jarvis-Selinger *et al.* 2006; Deggs *et al.* 2008).

It seems likely that 'learning about teaching as part of the undergraduate medical curriculum' will also vary depending upon individual stakeholder conceptions of teaching, as would any learning outcomes in teaching they might suggest for this. This section outlines the dominant conceptions of teaching found in the broad education literature, before considering more specifically conceptions of teaching found in the medical education literature. In reviewing the extensive, complex and somewhat interwoven literature on conceptions of teaching, it was found to be helpful to tag common themes or conceptions in an easily readable and comparable format. Simple pictograms were drawn for this purpose, and as they proved helpful these are included here to help the reader follow the analytic process.

Aristotelian conceptions of teaching

In the Nicomachean Ethics, written around 330 B.C., Aristotle (translated by Ross 1980) distinguishes two types of 'Virtue' (or 'Excellence', *Arete* in Greek): 'Moral Virtue' (*Ethos*) - disposition, or virtue of character, and 'Intellectual Virtue' (*Dianoia*) - virtue of thought. He emphasises the distinction in stating, "Intellectual virtue in the main owes both its birth and its growth to teaching (for which reason it requires experience and time), while moral virtue comes about as a result of habit" (Aristotle - translated by Ross 1980, Book II:1 p28). He also defines Moral Virtue as "The state of character which makes a man good and which makes him do his own work well" (Aristotle - translated by Ross 1980, Book II:6, p37), and considers it to be prerequisite for effective teaching and learning, because "The soul of the student must first have been cultivated by means of habits… like earth which is to nourish the seed. For he who lives as passion directs will not hear argument that dissuades him, nor understand it if he does" (Aristotle - translated by Ross 1980, Book X:9,

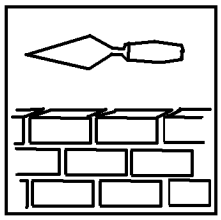
pp270-1). Aristotle also subdivides Intellectual Virtue into five 'States'. These are 1) 'Science' (*Episteme*) - the capacity to demonstrate, particularly with regard to knowledge and understanding (by *Theoria* or 'Theorising'); 2) 'Art' (*Techne)* the capacity to make or craft things (*Poiesis* or 'Production'); 3) 'Practical Wisdom' (*Phronesis* or 'Prudence') – the capacity to deliberate well and act with regard to what is good for people (*Praxis*); 4) 'Intuitive Reason' (*Noesis*) - the capacity to grasp first principles; and 5) 'Philosophic Wisdom' (*Sophia*) - the capacity to consider 'universal' things that are 'highest by nature' through a combination of Intuitive Reason and Science (Aristotle - translated by Ross 1980, Book VI:3-7, pp140-7; Kemerling 2010). Note that the meanings of some of these terms, such as the word 'science', have changed over time and through translation. What Aristotle describes as 'Art', for example, is closer to the modern meaning of the word 'craft' than 'art' (Dunne 1993). Aristotle (translated by Ross 1980, Book VI, p140) focuses on Science in relation to teaching, writing "Every science is thought to be capable of being taught, and its object of being learnt. And all teaching starts from what is already known… sometimes through induction and sometimes by syllogism". In the Analytics, Aristotle (translated by Ross 2000) also elaborates on Science and Knowledge in relation to teaching, but does not elaborate on the other four States of Intellectual Virtue in relation to teaching. Aristotle does not, therefore, explicitly compare different perspectives of teaching or of learning to teach, although his classification of Intellectual Virtues are frequently cited, critiqued and elaborated upon in the literature for such purposes.

Dunne (1993, p5) uses Aristotle's framework to criticise what he describes as the 'Instrumentalist' conception of teaching inherent in behavioural objectives. He argues that these artificially separate ends (objectives) from means (methods and approaches), assume neutrality of the teacher and of the objectives, and can miss experiences and influences which are not easily described or verified by assessment. He argues that behavioural objectives describe only poorly the knowledge and capacities required of teachers because they relate more to the expert knowledge (*Techne*) required to make things (*Poiesis*) than they do with the practical knowledge (*Phronesis*) required for the regulation of conduct in public (*Praxis*). He writes "In exploring phronesis I shall be emphasising its experiential nature, the immediacy of its involvement in concrete situations, and the responsiveness and resourcefulness in these situations… not from any knowledge that can be made available in treatises or manuals" (Dunne 1993, p228). Dunne's work helpfully illustrates these two conceptions of teaching, although in doing this he presents a particularly narrow and restrictive view of outcomes-based education.

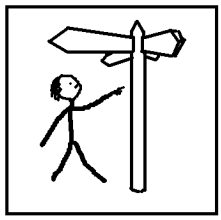
Carr (2000) uses Aristotle's distinction between the discernment of right ends (*Phronesis*) and the selection of means to achieve pre-determined ends (*Techne*), to support his assertion that being able to teach is more about being able to make 'moral' judgements than it is about having mastered various techniques. He writes, "Education is at heart a <u>moral</u> practice which is deeply implicated in values and conflicts of value – rather than a technological enterprise directed towards the efficient achievement of agreed ends" (Carr 2000, pp75-76, emphasis in original). Note however that Carr's terms 'moral wisdom' (*Phronesis*) and 'moral practice' (*Praxis*) should not be confused with Aristotle's concept of 'moral virtue' (*Ethos*).

Korthagen *et al.* (2001) argue that most traditional approaches to teacher training seek to change teachers' practice based on external conceptions of good teaching, rather than focusing on the needs, concerns and practical experiences of the teachers themselves. Using Aristotle's distinction between general, abstract and objective scientific knowledge (*Episteme*), and situation-specific, concrete and subjective knowledge from real practice (*Phronesis*), they argue that the latter has been seriously neglected and is likely to be more effective in helping people become better teachers. They thus propose an alternative approach to teacher training involving reflection and theorising about real examples from teachers' own practice, which they call 'Realistic Teacher Education' (Korthagen *et al.* 2001, Chapter 2).

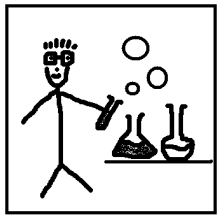
Following this philosophical thread from Aristotle through Dunne, Carr and Korthagen, three distinct conceptions of teaching can be identified. These have been labelled 'teaching as production' (requiring technical skills), 'teaching as practice' (requiring prudence or phronesis), and 'teaching as science' (literally 'theorising', but closer in meaning to the modern term 'science'). These are represented pictorially in Figure 2.3. No modern literature was identified which explores Aristotle's other two Intellectual Virtues, conceptualising teaching in relation to Intuitive Reason or Philosophic Wisdom, although this could be an interesting avenue for future research.



Teaching as Production (*Poiesis*)
Teaching, like any other process involving making or crafting something, requires that teachers have a range of technical abilities (*Techne)* to enable them to achieve pre-determined goals.



Teaching as Practice (*Praxis*)
Teaching, like any other public activity involving the regulation of conduct and acting with regard to what is good for people, requires practical knowledge and capacity to deliberate well (*Phronesis*).



Teaching as Science (*Theoria*)
Teaching, like any other science, involves theorising and the development and application of knowledge and general principles (*Episteme*) to predict and then find ways to achieve desired goals.

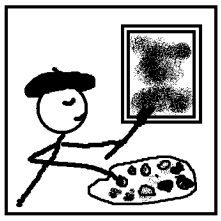
Figure 2.3 - three teaching conceptions based on the intellectual virtues described by Aristotle (translated by Ross 1980)

Conceptions of teaching based on Squires seven 'paradigms'

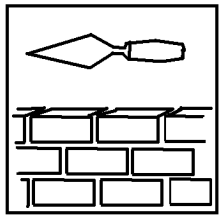
Kuhn (1962) described a conception with associated beliefs, attitudes and practices as a 'paradigm'. Squires (1999, Chapter 1) used this concept to analyse the education literature and identified seven different 'paradigms' of teaching. From

these he concluded that none were entirely sufficient and so went on to define an eighth paradigm, teaching as a professional activity, which resembles very closely Carr's interpretation of Aristotelian 'teaching as practice' (*Praxis*) outlined above. These eight paradigms of teaching are represented in Figure 2.4. Squires (1999, p21) reminds us, however, that such paradigms of teaching, "Do not usually manifest themselves in pure or discrete form, but rather in the messy, semi-conscious and eclectic use that characterizes much of our practice. We may espouse one paradigm, and act out another… We may shift from one to another over time… different paradigms may reflect different aspects of our work".

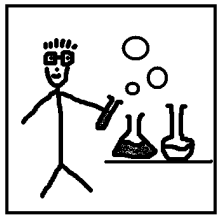
Teaching as Common Sense
People already organise, plan, explain, answer questions, criticise and encourage in everyday life. Training is largely unnecessary (except e.g. for assessment or lecturing) and theory can be ignored, as the teacher will be able to pick it up instinctively.



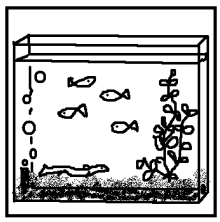
Teaching as an Art
Teaching is an aesthetic performance which is original, contingent and personal. It cannot be planned, nor can teachers be trained. One should instead seek to recruit naturally gifted individuals. This conception can be seen in the work of Highet (1950).



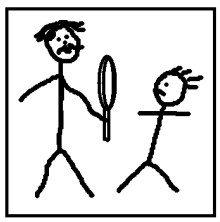
Teaching as a Craft
As with other crafts such as building, pottery and woodwork, teaching is an explicable and objective activity which one can demonstrate, imitate, practise and master. This conception relates well to Aristotelian 'Teaching as Production (*Poiesis*)'.



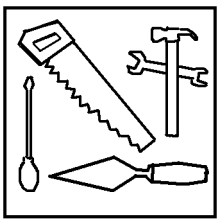
Teaching as an Applied Science
Teaching can be studied like any other science to investigate and determine fundamental rules, principles and patterns, with predictable outcomes. Squires feels this is the paradigm adopted by educational psychologists such as Skinner, Bruner and Bandura. It relates to Aristotelian 'Teaching as Science (*Theoria*)'



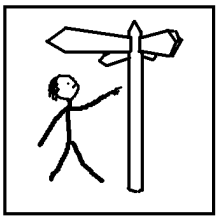
Teaching as a System
Teaching is part of a complex system which is self-regulating through feedback. Processes, sequence, relationship between components and outcomes can be studied, but novices need to think about the whole and avoid considering things in isolation.



Teaching as Reflective Practice
Teaching is viewed as a process of helping learners to reflect and develop the skills of a reflective practitioner (after Schön 1983). Development as a teacher also involves reflection on and in action. Squires sees this as one part of Kolb's (1984) cycle.



Teaching as a Competence
Teaching can be broken-down into a large number of different abilities which enable the teacher to do something in the real world. It includes skills, the ability to match skills to tasks required, and the stamina required to carry them out.



Teaching as a Professional Activity
Teaching, like any other professional work, is instrumental (aiming at some effect beyond itself), contingent (dependent upon context) and procedural (involving certain ways of doing things). It requires time and deliberate practice to learn and develop expertise. It relates to Aristotelian 'Teaching as practice (*Praxis*)'.

Figure 2.4 – eight conceptions based on Squires' paradigms (Squires 1999)

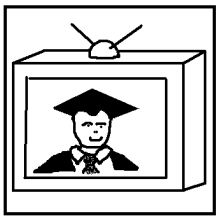
Teaching as Reflective Practice

Squires relates the 'teaching as reflective practice' paradigm to the 'Reflection' phase of Kolb's (1984) cycle, considering it to be incomplete without inclusion of the Conceptualisation, Experimentation and Experience phases. The conception of teaching as reflective practice was first introduced by Schön (1983; 1987), and has continued to feature prominently in the literature since that time. Some authors have also described a more critical version of reflective practice, such as Cranton and Carusetta (2004) who present it as a major component of what they describe as 'authentic teaching', along with being genuine, acting in a way consistent with ones' values and encouraging authenticity in others. As Cranton (2002, p6) writes, "When we bring our sense of self into our teaching, or in other words, work toward becoming authentic, we are able to critically question that which is right for us from the literature, develop our own personal style, and thereby communicate with students and others in a genuine way". This critically reflective practice of 'authentic teaching' has subsequently been explored by other authors, notably Kreber *et al.* (2010), and would seem to go considerably beyond the model of experiential learning described by Kolb. The literature on experiential learning, deliberate practice, and the nature of professional 'expertise' has also developed considerably in the past few decades (Benner 1984; Ericsson 2004; Ericsson *et al.* 1993; Eraut 1994). The conception of 'teaching as reflective practice' still seems to helpfully encapsulate both the teacher being reflective in their work and them encouraging learners to reflect on concrete experiences and so is included here.

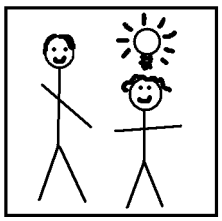
Learner-centred and teacher-centred conceptions of teaching

In 1984, Marton, Hounsell and Entwistle (1984) published a book which highlighted the importance of the learning experience in Higher Education, and the need for teachers to focus more on what the learner does (i.e. learning) than on what they do themselves. Whilst this idea had been around for a long time, their approach was novel in employing research evidence on the impact, positive and negative, that different approaches to teaching may have upon student learning. In a chapter entitled 'Understanding teaching and teaching for understanding', Hounsell (1984, p189) writes "Discussion has almost overwhelmingly been centred around lecturers' perceptions of the teaching-learning process. It derives from the vantage-points

which they occupy and it is concerned in the main with the activities in which they – rather than their students – are engaged". This 'teacher-centred' approach is contrasted with a 'learner-centred' approach, in which the main task of the teacher is to think and ask about their students' experiences of learning and adapt their teaching to maximise student learning (Figure 2.5). Some authors refer to teacher-centred approaches as 'instruction', 'non-constructivist' or 'quantitative' conceptions of teaching, and student-centred approaches as 'construction', 'co-construction' or 'qualitative' conceptions of teaching (Carnell 2007; Harris and Alexander 1998; Barr and Tagg 1995; Åkerlind 2007). Barr and Tagg (1995 - emphasis in original) exemplify this distinction in writing, "To say that the purpose of colleges is to provide instruction is like saying that General Motors' business is to operate assembly lines… our mission is not instruction but rather that of producing learning with every students by whatever means works best". Kugel (1993) proposes that most novice teachers begin by being teacher-centred, and then with experience gradually move towards more learner-centred conceptions of teaching. Pratt (1992), however, warns against suggesting that some conceptions of teaching, or the teachers that hold them, are somehow 'better' than others.



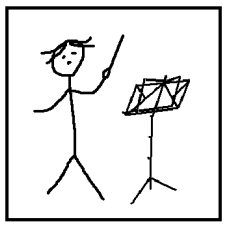
Teaching as a teacher-centred activity
Teaching involves a range of activities such as lecturing, tutoring and assessing – each of which can be learned and practised until the teacher becomes proficient in their delivery.



Teaching as a learner-centred activity
Teaching is about maximising student learning, using whatever means are most appropriate for the individual context and learner. Teacher training should emphasise the importance of student learning and meaning-making, rather than specific techniques.

Figure 2.5 – teacher and learner centred conceptions (Marton *et al.* 1984)

Ramsden (2003, p17) summarises some of this literature in a book designed to help new higher education teachers, although in doing so introduces a third conception of teaching as 'managing student activity' (Figure 2.6), although does not offer any references or evidence for this conception.

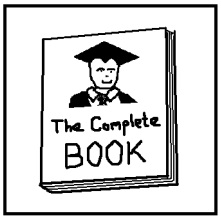


Teaching as managing learner activity
Students learn best by doing things. Teaching is about directing student activities, ensuring they are active, engaged and busy. Teachers can improve in teaching by expanding their repertoire of techniques and activities.

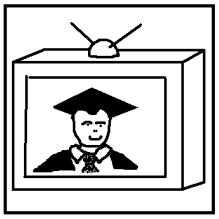
Figure 2.6 – Teaching as managing learner activity from Ramsden (2003)

Kember (1997, p255) took a more systematic approach to this literature by reviewing and synthesising thirteen research studies on university academics' conceptions of teaching. He defines five conceptions of teaching on a continuum between 'Teacher-centred/content-orientated' and 'Student-centred/learning-orientated' (Figure 2.7). Four of these map closely onto conceptions identified in one of the articles he

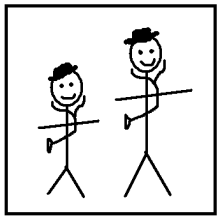
reviewed by Pratt (1992), and the fifth most teacher-centred conception, 'teaching as imparting information', was identified elsewhere. The middle conception, teaching as interaction (apprenticeship), relates closely to the concept of 'legitimate peripheral participation' in which learners participate in real situations and communities of practice and over time develop the experience and skills required for full participation (Lave and Wenger 1991). In the most student-centred conception, 'teaching as supporting growth and conceptual change', the teacher might be described as a gardener tending a plant or a companion on a journey (Fox 2006), in which the final outcome of learning (the form of the plant or destination of the journey) is dependent on the learner and cannot be entirely predicted by the teacher.



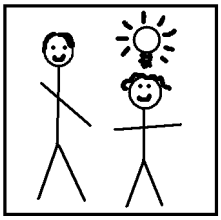
Teaching as imparting information
Teaching is about presenting information accurately, and so requires teachers to be knowledgeable content experts. Whether the learner can understand, remember or apply this information is not the teacher's concern. This conception was not found by Pratt.



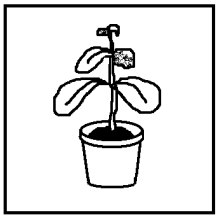
Teaching as transmission of structured knowledge
Teaching is about presenting or packaging information in a structured and simplified way so that students can understand it. Teachers are content experts and should have some understanding of their target audience. Pratt calls this 'transmission'.



Teaching as apprenticeship
Teaching involves interaction between the expert practitioner teacher and the learner, who is gradually encouraged to think and act in a similar way to the teacher through modelling, questioning and feedback. Kember calls this conception 'interaction', but Pratt's term 'apprenticeship' seems to be more suitable.



Teaching as facilitating understanding
Teaching is about helping learners to develop their understanding of content, so they can integrate it with their prior learning and apply it to new situations and not simply regurgitate what the teacher has said. Pratt calls this 'developmental'.



Teaching as supporting growth & conceptual change
Teaching is about creating suitable conditions for the learner to grow and develop, challenging prior conceptions and supporting their own knowledge construction. As with plants, the teacher cannot work to precisely defined ends. Pratt calls this 'nurturing'.

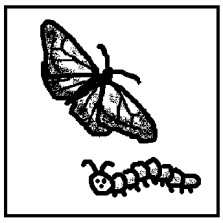
Figure 2.7 – Five conceptions of teaching from a review by Kember (1997)

Transformational conceptions of teaching

Personal transformation

Building on Mezirow's (1991) concept of transformational learning, a number of authors have begun to adopt and promote the conception of teaching as an activity

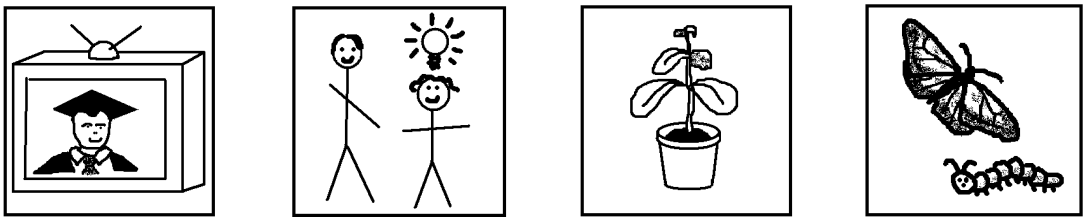
designed to promote learner transformation (Dall'Alba and Barnacle 2007; Cranton 2002; Dall'Alba 2004). Transformation can be seen as a process through which "An individual becomes aware of holding a limiting or distorted view. If the individual critically examines this view, opens herself to alternatives, and consequently changes the way she sees things, she has transformed some part of how she makes meaning out of the world" (Cranton 2002, p64). Such transformations are typically significant step-wise changes rather than gradual. Teaching as transformation is more about intention than method, "There are no special methods that guarantee transformation, although transformation is always one of our goals" (Cranton 2002, p71). Cranton does, however, argue that teachers can promote learner transformation through activating events, articulating assumptions, critical self-reflection, being open, engaging in discourse, revising assumptions and acting on these revisions (Figure 2.8).



Teaching as supporting transformational learning
Teaching is about creating appropriate conditions for individual transformational learning to occur through challenge, support and learner empowerment.

Figure 2.8 – The transformational conception of teaching

Trigwell and Prosser (1996) also differentiate the transformational conception of teaching 'helping students change' (Figure 2.9), from what they consider to be progressively less sophisticated conceptions of teaching as 'helping students develop', 'helping students acquire' and 'transmitting'.



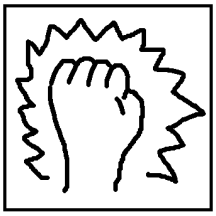
Transmitting | **Helping students acquire** | **Helping students develop** | **Helping students change**

Figure 2.9 – Four 'how' conceptions of teaching (Trigwell and Prosser 1996)

Social Transformation

Pratt (1992, Figure 2.10) identified a fifth conception of teaching in addition to the four which Kember outlined which he called 'social reform'. From this perspective, "Effective teaching seeks to change society in substantive ways... the object of teaching is the collective rather than the individual. Good teachers awaken students to the values and ideologies that are embedded in texts and common practices within their discipline" (Pratt *et al.* 2001, p3). Kember (1997, p259) argues that this conception is "Inconsistent with the goals of universities, founded on Western models, which stress critical thinking and encourage the plurality of viewpoints".

Nevertheless this conception appears repeatedly in the educational literature. Notable examples include Freire's (1972) work on the power of education to free learners from oppression, Postman and Weingartner's (1971) controverisial book 'Teaching as a subversive activitiy', and Goleman's (1996, p279 & p286) book on 'emotional intelligence' in which he argues that education should be involved in "Taking up the slack for failing families in socializing children", because "As a society we have not bothered to make sure every child is taught the essentials of handling anger or resolving conflicts positively". In Higher Education, Entwistle (1988, p226) observes that "The narrow view accepts the existing role of education in reproducing society as it is now, while the broad view may envisage education as a way of changing society", Walker (2009, p231) highlights the importance of humanities teaching to create a "A World that is worth living in", and Nixon (2004, p251) argues that "The reclamation of the moral bases of academic practice, by us as academic practitioners, is essential if universities are to contribute to the building of a good society". Similarly, in her book on 'critical pedagogy', McLean (2006, p1) seeks to address the question "How can university teachers practise pedagogy which is attentive to how their students might as citizens of the future influence politics, culture and society in the direction of justice and reason?". In the light of these articles, Kember's rejection of the conception of teaching as a vehicle for social reform seems somewhat contrary to the critical thinking and plurality of viewpoints in Higher Education which he seeks to promote.

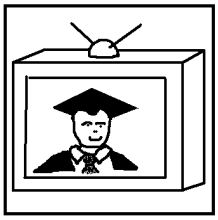


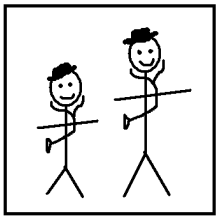
Teaching as social reform
Teaching is about changing society for the better through educating and empowering the young. Education can emancipate learners from oppression. Teachers should question societal 'norms' and assumptions, and teach learners to be similarly critical

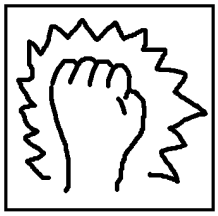
Figure 2.10 – the Social Reform conception of teaching (Pratt 1992)

The issues of different purposes of teaching is explored further by Carr (2000), who argues that teachers must make moral or value judgements about the 'right ends' in teaching (*Praxis*) as well select methods to achieve these ends (*Techne*), but that such judgements are not universal, but rather are relative to nationality, culture, religion and other factors. He argues, "It seems reasonable to suppose that notions of human learning and development cannot be other than normative: that, in short, there cannot be any notion of human formation which does not embody some specific conception of human flourishing – which may also be entirely at odds with other conceptions" (Carr 2000, p134, emphasis in original). Thus teaching will be heavily influenced by teachers' own experiences, their concept of human flourishing, and the purposes they are trying to achieve in their teaching. He identifies four distinct purposes of transmission, vocational training, 'rational emancipation', and the promotion of autonomy and self-directed learning (Carr 2000, pp174-180, Figure 2.11). Fanghanel (2007) echoes this position and highlights other potential influences on teaching conceptions and purposes including 'agentic' behaviours or positioning adopted by lecturers resulting from 'identification' or 'resistance' to the values or ideological frameworks within which they are working, their academic discipline, department, institution, pedagogical beliefs, workload, external influences

such as accrediting bodies and professional frameworks, and competing interests such as research.


Transmission


Vocational training


Emancipation (Social Reform)

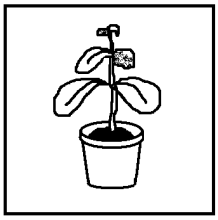
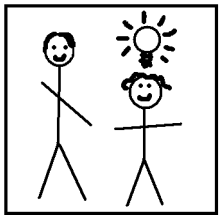
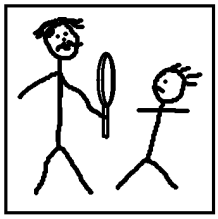

Promote autonomy

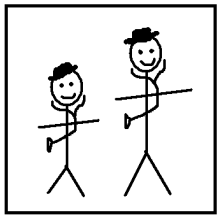
Figure 2.11 – four conceptions of teaching based on Carr's (2000) 'purposes'

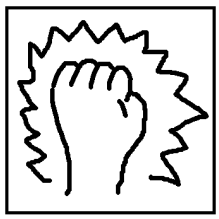
Robson's conceptions of good teaching

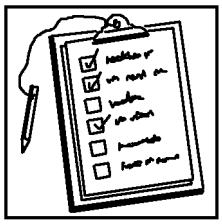
Robson approaches the literature somewhat differently by posing the question "What is good teaching?" (Robson 2006, pp50-55). Four of the conceptions she identifies, 'working with difference', 'reflective teaching', 'contextual' and 'critical pedagogy', can be mapped onto conceptions discussed already. She also identifies two other conceptions of good teaching however, the 'official view' and the 'scholarship of teaching' (Figure 2.12). The 'official view' suggests that teaching excellence is about reaching targets, increasing student numbers, auditing practice and instituting processes of quality enhancement. It is sometimes refered-to as a 'managerialist' approach, as many of the concepts come from business and management literature including change management, audit, quality assurance and governance (Fanghanel 2007; Deem 1998; Fergusson 2000; Nixon 2004). The 'scholarship of teaching', in the way it is now understood, was first described by Boyer as one of the four key 'functions' of university academics. He writes, "The work of the professoriate might be thought of as having four separate, yet overlapping, functions. These are: the scholarship of discovery; the scholarship of integration; the scholarship of application; and the scholarship of teaching" (Boyer 1990, p16, emphasis in original). He thus conceptualised teaching as one aspect of a multi-faceted role which included these other related activities. Shulman (2000) further defines the 'scholarship of teaching' as teaching which has been made public, peer-reviewed, and shared with other members of the community. Following a Delphi study with experts, Kreber (2002) defined it as teaching which is continuously examined and enhanced through engagement of the teacher in a process of ongoing critical reflection on experience and through research. The scholarship of teaching literature continues to expand rapidly, particularly in relation to learner-centeredness (e.g. Boshier and Huang 2008), and the relationship between teaching and research (Brew 2003).


Working with difference

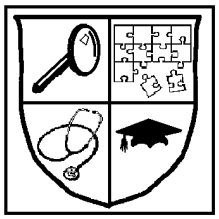

Reflective teaching


Contextual


Critical pedagogy



Teaching as managed processes
Teaching, like any other social process, can be managed by defining and auditing measurable targets such as assessment results and the timing of feedback and review. Teachers should show that they are effective, efficient, responsive and accountable.

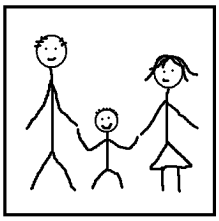


Teaching as a form of scholarship
Teaching is one of four overlapping areas of academic scholarship, and as such should be subjected to public scrutiny and continuously reviewed, critiqued and enhanced. Teachers should also be engaged in other areas of scholarship.

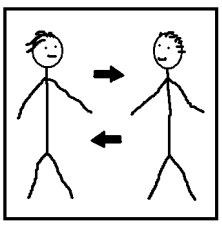
Figure 2.12 – six conceptions of good teaching based on Robson (2006)

Parent-Child and Adult-Adult conceptions of teaching

Knowles (1968) article 'Andragogy, not pedagogy' has had a significant impact on the conceptions and approaches of teachers in higher education. Knowles *et al.* (2011) essentially encourage teachers to base their practice on learning principles derived from adults (as examples they highlight the work of Tough, Dewey, Bruner, Crutchfield, Bandura and Mezirow), rather than work on learning in children and animals (they highlight the work of Hilgard, Thorndike, Guthrie, Skinner, Hull, Tolman and Gagné), arguing that these are more relevant to adult education. Although this assertion is contested, and a number of studies have failed to differentiate adult from non-adult students based on andragogical principles (Rachal 2002), these two conceptions are still commonly found in the literature (Figure 2.13). In both the teacher interacts with the learner to facilitating learning, but they are distinguished by the dynamics of this interaction – in a manner consistent with Berne's (1964, pp23-32) analysis of transactions between individuals in Parent, Adult or Child 'ego states'.



Teaching as parent-child interaction
Teaching is primarily about facilitating learning through structure, reinforcement, behaviour management, and a system of reward and punishment.

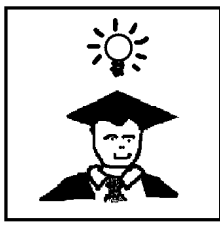


Teaching as adult-adult interaction
Teaching is primarily about facilitating self-directed learning through the application of a core set of adult learning principles to individual learners and situations.

Figure 2.13 – Parent-child and adult-adult conceptions of teaching

Teaching as a means to enhance the teachers' own learning

Many authors in the literature discuss the benefits of teaching for teachers themselves, and there is evidence that learning content to teach it results in better understanding and recall than learning for a test (Bargh and Schul 1980; Peets *et al.* 2009). In the 'Ripple' model, however, Race goes further in suggesting that learners should teach, explain, coach and assess with the purpose of furthering their own learning (Figure 2.14). He writes, "People remember surprisingly well the very first time they attempted to teach something… They often remember that they didn't at that stage do it particularly well, but more important, they remember that they made sense of the topic a great deal more than they had done hitherto" (Race 2010, p27). Race does not, however, particularly focus on the benefits or otherwise for those being taught.



Teaching as a learning activity

Teaching, explaining, coaching and assessing are excellent learning activities, and can help the learner to reinforce, consolidate, structure and articulate the content they are learning. All learners should be encouraged to teach.

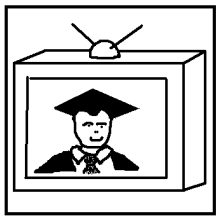
Figure 2.14 – Teaching to enhance the teachers' own learning (Race 2010)

Conceptions of teaching in medicine

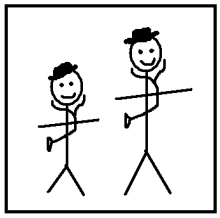
Conceptions of teaching have been shown to differ between academic disciplines (Jarvis-Selinger *et al.* 2006; Deggs *et al.* 2008; Fanghanel 2009). No previous studies were identified which specifically explored the conceptions of teaching of stakeholders in the undergraduate medical curriculum. Nor were any studies identified which compared the conceptions of medical teachers with teachers from other disciplines, although Taylor *et al.* (2007) administered the Teaching Perspectives Inventory to eleven medical educators, ten of whom were physicians, and found that most scored highest in the Developmental and Apprenticeship categories, then Transmission and Nurturing categories, with all but one scoring lowest in the Social Reform category. The conception of teaching as social reform is also infrequently identified in the medical education literature (DasGupta *et al.* 2006). Williams and Klamen (2006) constructed their own tool to survey the core teaching beliefs of 125 mixed medical educators and found that 27% expressed 'Performance-orientated' beliefs (which mapped to Pratt's 'apprenticeship' conception), 26% expressed 'Student-orientated' beliefs (Pratt's 'developmental' conception), 6% expressed 'Content-orientated' beliefs (Pratt's 'transmission' conception), and the remaining 41% expressed combinations of these. Weurlander and Stenfors-Hayes (2008) identified five categories of teaching conception from interviews with a mixed group of clinical and non-clinical medical teachers. Four of these, teaching as Presenting, Explaining, Facilitating and Coaching, map well onto Kember's conceptions of 'imparting information', 'transmission', 'facilitating understanding' and 'supporting growth and conceptual change' respectively. The fifth, teaching as 'organising student activity', maps well onto Ramsden's 'teaching as managing learning activity'. In reporting their experiences of conducting faculty development workshops exploring the teaching beliefs of mixed medical teachers, Bulik and Shokar (2007) report a number of metaphors for teaching, many of which have been created by workshop participants. These include teacher as 'sage-on-the-

stage' (which maps well to Pratt's 'transmission' conception), 'guide-by-your-side' / 'personal trainers' / 'lamplighters' (which map to aspects of Pratt's 'developmental' conception), and 'craftsperson', 'artist' or 'applied scientist' (which map to Squires' conceptions of teaching as 'craft', 'art' and 'applied science' respectively).

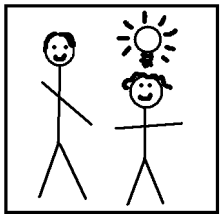
Harden and Crosby (2000) sought to define the nature and roles of medical teachers based on analysis of the literature and the redesign and implementation of the new Dundee undergraduate medical curriculum. They refer to the work of Biggs and Squires in considering the nature and roles of 'the good teacher', then go on to define six 'areas of activity' of medical teachers, each subdivided into two 'roles'. Although not presented as 'conceptions of teaching', the four areas of activity of teacher as 'information provider', 'role model', 'facilitator', and 'planner', map well onto Pratt's 'transmission', 'apprenticeship' and 'facilitating understanding' conceptions and Ramsden's 'teaching as managing learning activity' conception respectively. Two others, the teacher as 'assessor' and as 'resource developer', are not prominent conceptions of teaching in the general educational literature and are outlined in Figure 2.15.



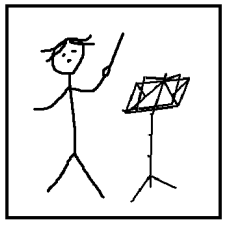
Providing Information



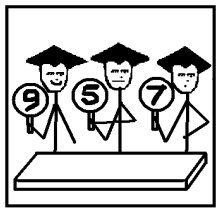
Role Modelling



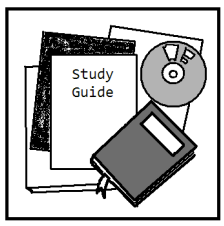
Facilitation



Planning



Teaching as assessment
Teachers assess learner performance both formatively and summatively, and give them feedback on how they performed and in many cases on how they can improve their performance in the future. They also 'assess' (evaluate) courses and curricula.

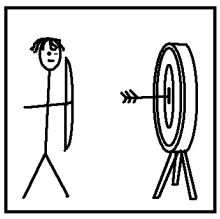


Teaching as developing resources
Teachers source, create and develop teaching materials, library resources, workbooks, computer-based learning materials and learning environments. They also create study guides and materials to tell the student what they should learn and how they can do this.

Figure 2.15 – Six 'areas of activity' of medical teachers from Harden and Crosby (2000)

Another concept which appears very frequently in the medical education literature and to a lesser extent the general education literature but is not actually labelled as a 'conception of teaching' is that of defining, negotiating, targeting and addressing learning needs (Harden *et al.* 1999a; Frank *et al.* 2010b; Harris *et al.* 2010). Such learning needs can be described in a variety of ways, such as with intended learning outcomes, competencies or aims. Outcomes-based education is discussed in detail in

Part 6. The conception of teaching as targeting learning needs is outlined in Figure 2.16.



Teaching as targeting learning needs
Teaching is about helping learners to identify and address their learning needs. This may involve teachers defining learning outcomes for the learner, a process of negotiation, or the teacher helping learners to identify and address their own learning needs.

Figure 2.16 – The conception of teaching as targeting learning needs

Many other articles were identified in the literature describing the qualities, attributes or approaches of medical teachers which could be mapped to one or more of the conceptions of teaching presented above. These included 'teaching as science' in the evidence-based medical education movement (Hammick and Haig 2007; Macsuibhne 2010), 'teaching as scholarship' (Glassic 2000; Association of American Medical Colleges 2007; Fincher *et al.* 2000), 'teaching as reflective practice' – including Schön's (1983; Schön 1987) own work with medical educators, and 'teaching as supporting transformation' (Wittich *et al.* 2010; Mennin 2010). One article explicitly contrasted 'teaching as supporting transformation' with what they see as a prevalent business model they referred-to as 'Fordism' (after Henry Ford's approach to automotive construction) which corresponds well to Robson's conception of 'teaching as managed process' (Dornan 2010). The conception of 'teaching as apprenticeship' is also frequently reported by medical teachers in the literature (Bleakley 2002; Neighbour 2004), including the importance of situated learning (Durning and Artino 2011). Squire's conception of 'teaching as a system' is reflected in discussions of learning contexts, environment and the importance of preventing negative influences on student learning (Wilkinson *et al.* 2006; Elnicki *et al.* 2007; Roff 2006; Pratt *et al.* 2009). His conceptions of 'teaching as competence' and 'teaching as common sense' can also be identified in the discourses surrounding the competency-based staff development, for example one paper entitled 'Competencies for medical faculty' states "In the past, it was assumed that intelligent people who have been students for many years have learned or can automatically learn to be successful faculty members" (Harris *et al.* 2007, p343). A number of direct references to Knowles conception of 'teaching as adult-adult interaction' were also identified, including an article describing an entire undergraduate medical programme based on adult learning principles (McNeil *et al.* 2006). McKenna and Wellard (2009, p275) also described a conception of teaching which mapped to 'teaching as parent-child interaction' when interviewing undergraduate nurse educators, finding "Maternal discourses emerged as a predominant one as participants presented their relationships with students describing examples of nurturing, protecting, supporting, guiding and providing discipline", although no similar examples were identified relating to the undergraduate medical curriculum.

Summary of conceptions of teaching in the literature

Twenty-four broad conceptions of teaching were identified from the literature in this review (Figure 2.17). Many of these could be identified in the medical education literature, although it was not clear from the literature how teaching is conceptualised by different stakeholders in the undergraduate medical curriculum. Squires (1999) argues that multiple paradigms of teaching can co-exist, and may relate to different aspects of a teachers' work, and Carnell (2007, p26) similarly argues, "Different conceptions are held by different people or by the same person in different circumstances and for different purposes". It is likely that any individual may hold more than one of these conceptions, or may hold personal variations on these conceptions which they may or may not be able to articulate. As Kreber (2010, p384) observes, "We think of formal conceptions as those which have undergone a process of critical scrutiny and are now in the public domain, typically in the form of books or articles. Implicit conceptions, by contrast… are personally constructed, are not in the public domain and are not recognised as formal theories". No mention of such implicit conceptions of teaching was identified in the medical education literature. **There is a gap in the existing literature about how different stakeholder groups involved in the undergraduate medical curriculum conceptualise teaching.**

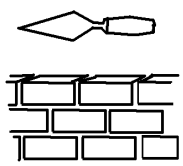
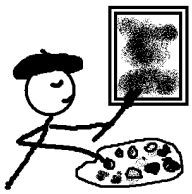
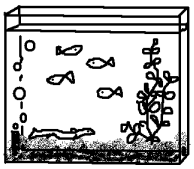
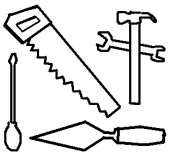
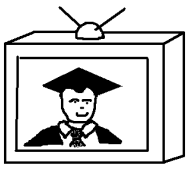
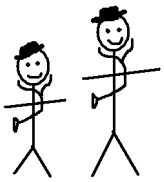
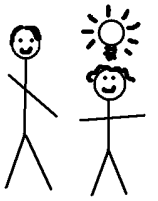
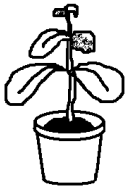
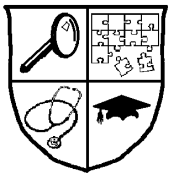
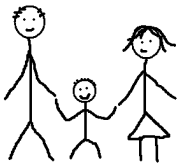
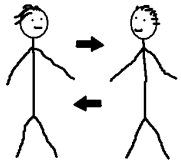
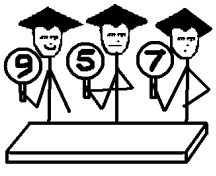
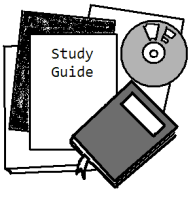
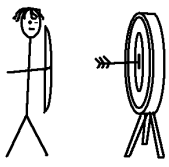
				
PRODUCTION (poiesis)	PRACTICE (praxis)	SCIENCE (theoria)	COMMON SENSE	ART
				
SYSTEM	REFLECTIVE PRACTICE	COMPETENCE	DIRECTING ACTIVITY	IMPARTING INFORMATION
				
TRANSMISSION	APPRENTICESHIP	FACILITATING UNDERSTANDING	SUPPORTING GROWTH	SUPPORTING TRANSFORMATION
				
SOCIAL REFORM	MANAGED PROCESS	SCHOLARSHIP	PARENT – CHILD INTERACTION	ADULT – ADULT INTERACTION
				
LEARNING ACTIVITY	ASSESSMENT	PROVIDING RESOURCES	TARGETING LEARNING NEEDS	

Figure 2.17 – Twenty-four teaching conceptions identified in the literature

5. The UK undergraduate medical curriculum (topic B)

The UK undergraduate medical curriculum is designed to prepare medical graduates to work as Foundation Year 1 doctors and to undertake further specialist training. The GMC (2009b, p5) stipulate that graduates must be able to "Demonstrate all the outcomes in *Tomorrow's Doctors* in order to be properly prepared for clinical practice and the Foundation Programme". This section explores and contextualises the UK undergraduate medical curriculum by outlining the structure and regulation of medical education in the UK and briefly contrasts these with medical education outside the UK.

The structure of medical education in the UK

Medical education in the United Kingdom is considered to have three phases – undergraduate, postgraduate and continuing professional development (CPD). Only the undergraduate phase takes place in a Higher Education context, with the postgraduate and CPD phases occurring in the professional context of the National Health Service (NHS), managed by the relevant Royal Colleges under the auspices of the GMC. A minority of individuals will choose to study for additional Higher Education qualifications during the undergraduate (typically an 'Intercalated' Bachelor degree) phase, or the postgraduate and CPD phase (typically Postgraduate Certificate, Diploma, Masters or Doctoral degrees). These additional qualifications may contribute towards career advancement, but are usually optional. The postgraduate phase of medical education is usually at least as long as the undergraduate phase, therefore the majority of UK medical education takes place outwith the Higher Education context.

The undergraduate phase

The UK undergraduate medical curriculum typically lasts five years and occurs within Higher Education institutions accredited for undergraduate medical education by the General Medical Council (GMC). There are also a small number of graduate-entry programmes lasting four years (GMC 2011c). Learners in the undergraduate phase are generally referred-to as medical students (GMC 2011b). Many aspects of undergraduate medical curricula are equivalent to other Higher Education disciplines. They are subject to university funding and governance structures. Students attend lectures and tutorials, undertake supervised project work and various types of written assessment. Some aspects are relatively unusual however, such as part funding from the National Health Service (NHS Tayside ACT Group 2011), the rapid pace of change in knowledge and practices within the discipline (Brice and Corrigan 2010), and the requirement to follow GMC guidance on medical student 'fitness to practise' in relation to their professionalism, ethical conduct and health (GMC 2010e). Other relatively unusual aspects include the emphasis on teaching and assessing clinical procedures such as venepuncture, the need for students to gain clinical experience in a wide range of speciality areas, and the emphasis on so-called 'clinical teaching' with real patients in general practice surgeries, outpatient clinics, teaching ward rounds, and at the bedside of hospitalized patients. Such 'bedside teaching' typically involves students being observed whilst they ask questions of the patient in a structured manner ('take a history'), perform a clinical examination,

formulate a diagnosis and suggest a management plan. The doctor, with or without other students, will then give them feedback and teach them on areas of need identified. The undergraduate phase ends at graduation with the award of a 'Primary medical degree', typically a 'Bachelor of Medicine and Bachelor of Surgery' (MBChB or MBBS), and provisional registration with the GMC.

The postgraduate phase (Foundation plus Specialist Training)

Postgraduate 'trainees' are employed by the National Health Service (NHS), receive a salary, and have service as well as training commitments. UK postgraduate medical education has changed considerably over the past decade. It now consists of a two year 'Foundation Programme' for all graduates, followed by a variable number of years in 'Speciality Training' for their chosen speciality. Almost all medical students in their final year apply and then enter a selection process for the Foundation Programme (NHS 2011b), unless they wish to work exclusively abroad or to leave clinical practice. Some apply for the small number of highly competitive 'Academic Foundation Programme' posts, which typically have research and / or teaching commitments and are designed to "Provide foundation doctors with the opportunity to develop research, teaching and leadership/management skills in addition to the current basic competences outlined in the curriculum" (NHS 2011a). During Foundation Year 1 ('FY1' or 'F1') the trainee typically undertakes three four-month jobs in different specialities in a single region, at the same time participating in a variety of structured educational and assessment activities (Forrest *et al.* 2006). If by the end of FY1 they have successfully achieved the learning outcomes defined by the GMC (2009a) in The New Doctor, they will be entitled to apply for full registration on the UK 'List of Registered Medical Practitioners' (GMC 2011e). The trainee will then enter Foundation Year 2 ('FY2' or 'F2') and undertake a further three four-month jobs in different specialities. Structured educational and assessment activities are also incorporated into FY2. Since 2010 these have included an assessment of a teaching activity or presentation called 'Developing the clinical teacher' (NHS 2010). During FY2 trainees will apply and be selected for speciality training.

There are currently 61 recognised postgraduate speciality training pathways ('Approved curricula systems') and 35 sub-speciality pathways in the UK (GMC 2010a). Each requires trainees to undertake further study, gain practical experience in the discipline, and successfully pass formal assessments (typically including workplace based assessment, portfolio and examinations) for 'Membership' of the relevant 'College'. The shortest is General Practice, which lasts at least three years in addition to the two year Foundation Programme, leading to 'Membership of the Royal College of General Practitioners' (RCGP 2006). General Surgery, for example, typically lasts eight years following the Foundation Programme (RCSEd 2010). In some specialities, such as general practice and paediatrics, the training is described as 'run through' or 'coupled', meaning that successful completion of each year automatically leads to entry into the next year. In other specialities, such as general medicine or surgery, the training is described as 'uncoupled'– meaning that after two years of 'Core Medical Training' or 'Core Surgical Training', trainees have to again apply and be selected in open competition for 'Higher Speciality Training' in their chosen medical or surgical sub-speciality (ISCP 2010). The postgraduate phase ends with the award of a 'Certificate of Completion of Specialist Training'

(CCST), which allows successful candidates to work independently as a Consultant or General Practitioner in the UK (GMC 2010b).

The continuing professional development phase

The CPD phase of medical education relates to Consultants and General Practitioners from completion of Specialist Training until they retire from medical practice. Learning activities and assessments in the CPD phase are currently less well defined than undergraduate or postgraduate, but include activities designed to maintain competence, keep up to date with advances in medicine, learn new skills and techniques, and develop areas of special interest and responsibility (GMC 2010b). Most Consultants and General Practitioners are now required to undertake yearly educational appraisals and show evidence of participation in a minimum number of hours of professional development activity. For some specialities, notably general practice, this has developed into a very structured and formal process with centralised organisation and appraiser training (NES 2011). From 2012 the GMC plans to introduce a formal process of 'Revalidation' for all UK doctors in the CPD phase, which will require them to regularly demonstrate that they remain 'fit to practise' (GMC 2011f).

Regulation of medical education in the UK

Establishment of the Craft Guild of Barber Surgeons of Edinburgh in 1505, the Royal College of Physicians of London in 1518 (by Royal Charter from King Henry VIII), and numerous other Colleges since, effectively empowered these organisations to control the training and practice of medicine in the UK until the nineteenth century. They enabled members to develop a sense of collective identity and over time gradually define their professional standards and the standards for the education of new practitioners (RCP 2010; RCSEd 2010). In the nineteenth century, 'overcrowding' of doctors, competition from 'unqualified practitioners' and intense lobbying particularly from the Colleges led to Parliament passing the Medical Act of 1858 (Parliament 1858). The Act legislated for what later became known as the General Medical Council (GMC) to regulate medical practice, oversee medical education and maintain a register of qualified practitioners (Irvine 2006). Initially the GMC was largely concerned with maintaining a register of approved practitioners and disciplining individual registered practitioners for professional misconduct (such as canvassing for patients, employing unqualified assistants and criminal offences). Over time it has become increasingly concerned with setting and maintaining general standards for medical practice and education (Irvine 2006), exemplified by their website which, for example, now includes online training modules (GMC 2010c). The GMC has also become increasingly concerned with postgraduate as well as undergraduate medical education, maintaining a 'Specialist Register' of doctors eligible to work as consultants in the UK health service since January 1997, and a 'General Practitioner Register' since March 2006 (GMC 2011e). Although Parliament set-up a separate body to oversee and regulate postgraduate medical education in 2005 called the 'Postgraduate Medical Education and Training Board (PMETB)', it merged with the GMC in April 2010 (PMETB 2010).

Since April 2010 the GMC has been officially responsible for setting standards and regulating all three phases of medical education and training in the UK (GMC 2010b). The relationship between the GMC, the Royal Colleges and the National

Health Service remains complex. Each body publishes guidance and policy, and maintains a degree of legitimate authority over those practitioners who are registered with, affiliated with, or work for them respectively. All postgraduate trainees, for example, must be registered with the GMC and comply with the Generic Standards for Speciality Training (GMC 2010d), must comply with any more detailed or stringent standards applied to that speciality by the relevant college, and are at the same time NHS employees with contractual obligations relating to service provision as well as training and development.

Doctors may teach in all three phases of medical education, in a wide range of contexts across the higher education and healthcare sectors, with diverse teaching, learning and assessment methods. Doctors involved in teaching are responsible to the GMC, their speciality College, their NHS employer and the university or 'Deanery' responsible for any students or trainees that they are teaching. The GMC conducts regular inspections of medical schools, primarily to ensure the learning outcomes and process requirements specified in *Tomorrow's Doctors* are being met (GMC 2009b). This process is referred to as 'Quality Assurance of Basic Medical Education' ('QABME', GMC 2011b). As the award of a medical degree in the UK confers automatic provisional registration on the medical register, the GMC have statutory authority to recommend that the Privy Council remove an institution from the list of universities that can award a UK medical degree if their requirements are not being met (GMC 2011b; Parliament 1858; Parliament 1983). The GMC also conducts regular inspections of deaneries responsible for postgraduate training to ensure their standards for deaneries (GMC 2010g) are being met, and again have the power to withdraw training post or programme approval (GMC 2011a). These standards apply to anyone who is involved in teaching students or trainees in these programmes, however small or informal might be their teaching role. In time doctors involved in teaching may also be responsible to an organisation such as the Academy of Medical Educators (AME 2011), which since 2006 has sought to establish itself as the College-like professional organisation for those specialising in medical education, with its own system of governance and standards of practice (AME 2009), although it has yet to achieve the membership and influence of the Royal Colleges.

Medical education outside the UK

The structure and regulation of medical education in the UK is somewhat unique, although comparisons can be drawn with medical education in other countries. Within the EU this is facilitated by a shared regulatory framework and the work of various EU-funded research projects and networks seeking to promote mobility, harmonisation and collaboration in European medical education such as MEDINE, MEDINE2, CHARME and EUROPET (MEDINE website 2007; MEDINE2 website 2011; Creusy *et al.* 2011; CHARME website 2011).

Medical education in Europe

Medicine is a 'regulated profession' within the European Community. Although under review, an EU Directive currently requires in all member states as a minimum that, "Basic medical training shall comprise a total of at least six years of study or 5,500 hours of theoretical and practical training provided by, or under the supervision of, a university" (EU 2005, Article 24.2) . The same EU Directive 2005/36/EC requires automatic cross-recognition of qualifications, allowing doctors

to move and practice freely between all member states. There is, however, considerable variation in undergraduate medical curricula across Europe in terms of their length, structure, admission criteria, learning outcomes, teaching and learning methods, qualifications awarded (which include MBChB, MMed and MD), and relationship between graduation and license to practise (Cumming 2010; Christensen 2004). Variation is also found in other disciplines of Higher Education and professional training across Europe, which since 1999 has led European Ministers of Education to work towards the creation of a 'European Higher Education Area' with easily readable and comparable degree structures (European ministers of education 1999; EHEA website 2011). This ongoing work, known as the 'Bologna process', has involved a series of meetings, statements and embedding legislation in each member state, including the adoption of a common three-cycle system of 'Bachelor', 'Master' and 'Doctor' degrees (EHEA website 2011; Joint Quality Initiative 2004). Comparing this 'Bologna three cycle' system with the current situation of European medical education reveals a number of discrepancies however (Figure 2.18, Ross 2007). Graduates of the 2nd Cycle 'Master' (primary medical) degree are entitled to call themselves a medical 'doctor'. A minority of institutions currently award a 'Master of Medicine' for the 2nd Cycle, and few (e.g. those in Denmark, Switzerland and the Netherlands) formally recognise completion of the 1st Cycle with a 'Bachelor of Medicine'. Most postgraduate training is undertaken outwith Higher Education in a professional healthcare setting, and the few who undertake a 3rd Cycle degree do so at different stages in their training (Cumming 2010; Ross 2007).

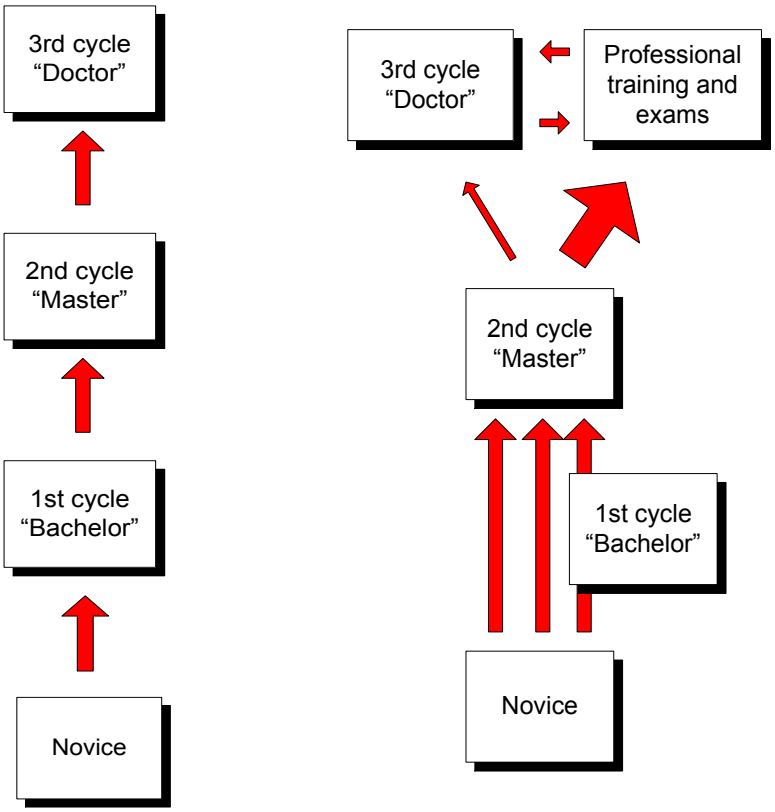


Figure 2.18 – Intended (left) and current (right) situation with regard to the Bologna three-cycle system of medical education in Europe (Ross 2007)

The Bologna process in medicine is controversial, and has been directly opposed by a number of influential supranational organisations, often with stated concerns about curriculum disintegration (AMEE *et al.* 2005; e.g. Christensen 2004). Despite this, the 'Tuning (Medicine)' project undertaken as part of the MEDINE Thematic Network found a high level of consensus between medical academics, graduates, employers and students on core learning outcomes for the Bologna 2nd Cycle (primary medical) degree (Cumming and Ross 2008). These have since been used to inform national and institutional curricula in various EU countries including Malta (Cacciottolo 2009), Lithuania (as part of an EU Structural Assistance Programme), and the UK (GMC 2009b). The MEDINE Network, in partnership with the World Federation for Medical Education ('WFME'), also developed and published 'European specifications' of the WFME Global Standards for Quality Improvement (WFME 2007). The MEDINE2 Thematic Network is continuing this work by developing tools and processes to help medical schools map their curricula against the Tuning (Medicine) 2nd Cycle learning outcomes, undertaking a Tuning project for Bologna 1st and 3rd Cycles in medicine, and liaising with the European Commission regarding the review of EU Directive 2005/36/EC on the recognition of professional qualifications (MEDINE2 website 2011).

Medical education outside Europe

The structure and regulation of medical education outside Europe is much more variable, and subject to a broader range of socio-political, economic and demographic influences. Boulet and colleagues illustrate this by observing, "The Caribbean, with a total population of less than 40 million, has 54 operating medical schools. In contrast, of the 57 African nations, 16 did not have a single medical school" (Boulet *et al.* 2007, p20). However, with Tuning Latin America and similar plans in Africa (European Commission 2009; Tuning Latin America project 2011), increasing uptake of the WFME Global Standards in China and elsewhere (WFME 2003; Schwarz *et al.* 2007), and standards such as the Canadian CANMEDS framework being adopted by diverse institutions across the globe (Frank 2005; Frank and Danoff 2007), there seems to be a current trend towards global convergence of medical curricula. This reflects similar trends in other Higher Education disciplines and the literature on globalisation and so-called 'travelling policy' (Ozga 2005; Ozga and Jones 2006; Faunce and Gatenby 2005). In the United States, all primary medical degree programmes are graduate-entry (for those with a BA or BSc in a related field), last four years and lead to the qualification of MD or 'Medical Doctor'. All students must pass a national 'exit exam' called the 'United States Medical Licensing Examination' (USMLE), and can then enter a 'Residency Programme' lasting three to seven years depending upon the speciality (FSMB and NBME 2011; Americal Medical Association 2011). They may then choose to undertake a further sub-speciality training as a 'Fellow'. U.S. Doctors in their first year after graduation used to be referred-to as 'Interns', but are typically now simply referred to as 'Residents'. It is therefore sometimes difficult to discern in the literature whether authors are referring to doctors in their first or seventh year following graduation, and the situation is compounded by academics in other countries using or translating the term 'Resident' in different ways.

6. Core learning outcomes (topic C)

Many different ways of describing the content of an educational programme can be found in the literature. There is considerable variation in terminology, and as well as learning outcomes it is common to find lists of 'topics', 'aims', 'competencies', 'goals', 'capabilities' and 'learning objectives'. Sometimes the differences between these are contested, and other times some are used interchangeably. Increasingly learning outcomes ('LO') are being used to describe the content of undergraduate medical curricula in the UK and elsewhere, and so this terminology has been selected for the current study to describe what medical students should learn in relation to teaching as part of the undergraduate medical curriculum. This section describes the nature of learning outcomes, and their strengths, limitations and alternatives.

The nature of learning outcomes

Learning outcomes can be defined as "Broad statements describing what students should possess on graduation from a course" (Harden 2002b, p152). This includes what graduates should know, what they should be able to do, and the manner in which they should approach their practice on graduation. The Tuning Project similarly define learning outcomes as "Statements of what a learner is expected to know, understand and / or be able to demonstrate after completion of a process of learning" (Gonzalez *et al.* 2003, p259). The emphasis in both of these definitions is firmly on the learner and what they will have learned by the end of a programme of study, a fixed point in the future. They do not describe what the learner has actually learned in the past tense, nor what they will be able to demonstrate at some earlier point during the programme. For this reason they are sometimes referred-to as 'intended learning outcomes', to distinguish them from the actual outcomes of learning observed during or after the programme of study – which cannot be entirely predicted, and some of which may be neither intended nor taught (Snyder 1970; Hussey and Smith 2003; Marton and Säljö 1976). As Allan (1996, p93) writes, "Learning outcomes represent what is formally assessed and accredited to the student and they offer a starting point for a viable model for the design of curricula in higher education which shifts the emphasis from input and process to the celebration of student learning". Methods of teaching, learning and assessment can then be selected and sequenced on the basis of their suitability for helping students to progressively learn and demonstrate their achievement of a particular learning outcome. This approach is commonly referred to as 'Constructive Alignment' (Biggs 1996). It synthesises 'Constructivism', the theory that learners arrive at meaning by constructing their own knowledge through individual and social activity, and 'Instructional Alignment', the theory that instruction should be designed so that teaching, learning and assessment are aligned with intended learning outcomes (Biggs and Tang 2009; Biggs 1996). Good quality outcomes-based education could therefore be summarised as student-centred approaches to teaching and learning, which take account of prior learning and individual differences, and which are constructively aligned with the intended learning outcomes of the programme (Ramsden 2003). Some authors also emphasise the importance of allowing optional student-selected learning outcomes in an educational programme, as well as those which are 'Core' for all students (Harden *et al.* 1984; Harden and Davis 1995).

Learning outcomes for undergraduate medical programmes are typically presented in a hierarchical framework, with eight to twelve 'Overarching' or 'Level 1' learning outcomes, each being further defined by a number of 'Detailed' or 'Level 2' learning outcomes (Cumming and Ross 2008; Simpson *et al.* 2002; Harden 2002b). Some may even go down to even more detailed 'Level 3' learning outcomes. For example the Level 1 learning outcome that graduates in medicine will be able to '*Carry out a consultation with a patient*', may be further defined by Level 2 learning outcomes such as '*Take a history*' and '*Carry out a physical examination*' (Cumming and Ross 2008, p14). '*Take a history*' may also be further defined by Level 3 learning outcomes such as '*Take a history of the presenting complaint*' and '*Take a past medical history*'. In addition to this 'level of detail' to which a learning outcome is described, the expected 'level of attainment' (or 'level of mastery') may also be indicated in various ways, such as with reference to the stages of 'Miller's pyramid'. Miller (1990) described four stages in the acquisition of clinical skills, in which firstly students *know* what is required for a particular task, then they *know how* to undertake the task, then they can *show how* to do it in an artificial setting, and finally they can *do* the task in a real clinical situation. For example, the current Tuning (Medicine) First Cycle project is using a questionnaire based on Millers' pyramid to explore to what extent key stakeholders in the undergraduate medical curriculum think the primary medical degree (Bologna Second Cycle) learning outcomes should be achieved by the end of the first three years (Bologna First Cycle) across Europe (Ross *et al.* 2011b). The level of achievement of learning outcomes could also be defined using Bigg's 'Structure of the Observed Learning Outcomes (SOLO)' taxonomy (Biggs and Tang 2009), or Harden's (2007a) four-dimensional model of learning outcome progression with increased breadth, increased difficulty, increased proficiency and increased application to practice.

Strengths and limitations of learning outcomes

Many reported strengths of learning outcomes and outcomes-based education can be found in the literature (Harden 2007a; Harden *et al.* 1999a; Hussey and Smith 2003; Harden 2002a; Harden 2001; Hubball *et al.* 2007; Willett *et al.* 2007; Harden 2007c; Davis *et al.* 2007), and are summarised here. They are seen to be comprehensive in describing a whole curriculum, yet prevent 'curriculum overload' by helping students and teachers focus mainly on core material. Their organisation in a hierarchy leads to transparency and clarity in stating the content of a curriculum and facilitates stakeholder consultation. It also helps curriculum planners to describe 'graduateness', to undertake 'fitness for purpose' evaluation, and regulatory and quality assurance activities. It also facilitates comparison and mapping with other curricula, exemplified by the cross-referencing of *The Scottish Doctor* and *Tomorrow's Doctors* learning outcome frameworks (Ellaway *et al.* 2007). Learning outcomes can be used as a framework for planning and sequencing teaching, learning and assessment, and as a means to consider levels of achievement, progression, linkage and integration between different parts of a programme. They also help students undertake self-directed learning. Learning outcomes allow considerable flexibility in the way curricula are structured and delivered, yet facilitate sharing of methods and teaching materials, and promote mobility and transfer between programmes. They may also promote interdisciplinary learning and teaching.

Many concerns and potential disadvantages of learning outcomes and outcomes-based education can also be found in the literature (Talbot 2004; Christensen *et al.* 2007; Hussey and Smith 2002; Fraser and Greenhalgh 2001; Rees 2004; Hussey and Smith 2003), and are summarised here. One of the principal concerns is around the potential for 'Reductionism' in which complex processes such as learning to consult with patients or learning to teach are broken down into component activities, the sum of which may not reflect the whole. Some authors suggest this may devalue experience, social learning, student interest and choice, and the importance of spending time engaged in learning, or that the artificial separation of outcomes and processes of learning may distract educators from quality assurance and enhancement of educational processes (Christensen *et al.* 2007). There is a particular concern that entirely outcomes-based curricula would become considerably shorter and superficial. This echoes Dunne's (1993) critique of so-called 'Instrumentalist' approaches to teaching which artificially separate outcomes and processes, and by so doing emphasise the expert knowledge (*Techne*) required to make things (*Poiesis*) rather than the practical knowledge (*Phronesis*) required for the regulation of conduct in public (*Praxis*), thus missing important experiences and influences which are not easily described. Other concerns are that curricula could be distorted towards the easily measurable rather than what graduates will need in real practice, and towards the 'lowest common denominator' or 'minimal competence' required to pass exams, rather than encouraging students to aspire to excellence. Learning outcomes can be difficult to write, and particularly with aspects of expert practice that typically become intuitive, even experts may not be able to define what is required in order to undertake a particular task due to them developing what Luft and Ingham (1955) refer to as 'unconscious competence'. Learning outcomes may give the appearance of clarity, but be written in rather vague language which does not specify the level of difficulty or the level of achievement, and may mean very different things to different people, leading to ambiguity and difficulty 'operationalising' them. Conversely, they may be too prescriptive or restrictive and limit student choice and so-called 'emergent' or 'patient-centered' learning. Learning outcomes also risk becoming dated, because as medical knowledge and practice is advancing so fast, graduates may need to be able to do things that could not be envisaged at the start of their undergraduate education. Criticism can also be found in the literature regarding lack of clarity in the process of outcome development, concerns that teachers and students might be forced to comply with imposed learning outcomes which are not in their best interests, and that learning outcomes may be subject to manipulation by managers, politicians, powerful professional or student bodies, and even the media. From a critical perspective, learning outcomes may be seen as a form of social policy in which one group or individual seeks to exert power and influence over others (Taylor *et al.* 1997), and in some cases individuals, whether academic, clinical, administrative or political, may have considerable influence on this process without being subject to public scrutiny (Williams and Lau 2004). There is also fear that education may become 'commodified' like a manufacturing or cloning process, in which consumers (learners) purchase measured products (competencies) and the teacher becomes just one of many workers on a production line. A final concern about defined learning outcomes seen in the literature is that they may not reflect what is actually taught by staff or learned by students (Harden 2007b; Lowry 1992), although the same could be said for any way of describing the content of a curriculum, emphasizing the need for continuous evaluation, review and development of any educational programme.

Alternatives to learning outcomes

Part of the aim of this thesis is '*To seek a range of perspectives on core learning outcomes in teaching for UK undergraduate medical curricula*'. The focus is therefore on learning outcomes, however in this section alternative ways in which to describe curricular content found in the literature are outlined, along with the alternative of not defining programme content at all. The potential use of aims, goals, topics, learning objectives, competencies and capabilities are briefly explored and reasons are offered for why they were considered to be less suitable for this purpose.

Not defining programme content

Some authors believe that the educational content of a programme should not be defined in advance, arguing for example that, "Education for capability must focus on process (supporting learners to construct their own learning goals, receive feedback, reflect, and consolidate) and avoid goals with rigid and prescriptive content" (Fraser and Greenhalgh 2001, p799). One of the greatest risks of this approach in medicine, perhaps counter-intuitively, is curriculum overload, with students trying to learn about everything they come across and become overwhelmed by the volume of material (Harden and Davis 1995; Dunn *et al.* 1985). One of the principal drivers for outcome-based medical education was the realisation that the amount of knowledge-based content students were required to learn was becoming unfeasibly large, and was distracting students away from developing their clinical skills and spending time with patients (Harden *et al.* 1999a; GMC 2010f; Harden and Davis 1995; Dunn *et al.* 1985). One author observed, "A major problem for curriculum and course planners is coping simultaneously with the expanding knowledge base and having less time to teach. A widely used solution is to include huge amounts of information in the curriculum. A better solution is to identify a manageable core of relevant knowledge" (Dunn *et al.* 1985, p699). Other significant potential disadvantages of not defining programme content include lack of clarity and direction both for learners and teachers, difficulty in consulting stakeholders or quality assurance, gaps in material covered and disjointed and out of sequence learning, and difficulty comparing different programmes or sharing materials (Harden *et al.* 1999b).

Aims and Goals

The aims and goals of an educational programme are not all necessarily related to what the learner will learn. It is not uncommon to see social, institutional and political aims and goals alongside aims and goals for student learning in the literature. As observed in the Tuning Project, "Learning outcomes are distinct from the aims of learning, in that they are concerned with the achievements of the learner rather than the overall intentions of the teacher" (Gonzalez *et al.* 2003, p259). Although goals are sometimes considered to be more detailed sub-divisions of aims, both are typically written in broad terms and are thus unsuitable as the basis for teaching, learning and assessment without father detail and contextualisation (McAvoy 1985).

Topics

Topics, sometimes referred to as 'subjects' or 'disciplines to be covered', may be helpful for those managing or timetabling the delivery of a curriculum, but they do not consider students' prior learning or learning preferences or offer detail with regards to what students should learn about a particular topic, and frequently emphasises the importance of factual knowledge in each area (Dunn *et al.* 1985).

Learning Objectives

Tyler's (1949) proposal that Higher Education curricula be defined in terms of learning objectives was rapidly and widely adopted in 1950s, leading to the publication of many books and articles on this topic – most notably Bloom's '*Taxonomy of educational objectives*' (Krathwohl *et al.* 1956; Bloom *et al.* 1956; Allan 1996). Educators were urged to carefully define what they expect their students to achieve in great detail, using standardised terminology, and to separate them into knowledge (or 'cognitive'), skill (or 'psychomotor'), and attitudinal (or 'affective') domains (Bloom *et al.* 1956; Anderson and Krathwohl 2001). Learning objectives and even outcomes are still sometimes separated into these domains (e.g. Bandaranayake 1985; Hoat *et al.* 2007; Blatt and Greenberg 2007). Whilst noting that superficially learning objectives often resemble learning outcomes, Harden (2002b) highlights that learning objectives are generally more numerous and detailed, are typically separated into knowledge, skills and attitudes, may not all be taught or assessed, and are often more prescriptive and teacher-centred than learning outcomes. It therefore seems more appropriate in the current research to use learning outcomes rather than objectives, being careful not to define them too narrowly nor to omit any because they seem to be difficult to define or difficult to assess. As one author warns, "It has been observed that the move to adopt OBE represents a return to Tyler's basic conception of objectives before it was corrupted by others. However, outcomes should not befall the same fate as objectives. We must guard against the narrow specification of outcomes" (Prideaux 2000, p168).

Competencies

Competencies (or 'competences') relate to what an individual understands and is able to do at the time, rather than what graduates of a programme will understand or be able to do in the future. The Tuning (Medicine) report states that, "Competences are acquired by, and belong to, students or graduates, rather than teachers. For a graduate who has successfully completed the degree programme, their competences should be at least equivalent to the prescribed learning outcomes" (Cumming and Ross 2008). For that reason 'competencies' and 'learning outcomes' are sometimes used almost interchangeably (Gonzalez *et al.* 2003; Gonzalez *et al.* 2005). 'Competency-based education' is increasingly prevalent in postgraduate and CPD medical education, and is starting to appear in the undergraduate literature (Harris *et al.* 2010; Leung 2002; Frank *et al.* 2010b). Most of the required teaching abilities for fully qualified doctors and other groups discussed in Part 3 were written as competencies. A recent review of the competency literature in medical education proposed that competency-based education be defined as, "An approach to preparing physicians for practice that is fundamentally oriented to graduate outcome abilities and organised around competencies derived from an analysis of societal and patient needs. It de-emphasizes time-based training and promises greater accountability, flexibility, and learner-centeredness" (Frank *et al.* 2010a). This definition closely resembles the perspective on learning outcomes from the medical education literature outlined

above, except for them having to be 'derived from an analysis of societal and patient needs'. As will be outlined in the next part of this Chapter, it is not clear from the literature whether consideration of graduate abilities and societal needs are most appropriate to inform the content of undergraduate medical curricula, and so competencies thus defined were thought to be overly-restrictive for use in current research. It is, however, anticipated that any resulting learning outcomes could be easily transformed into a competency framework for graduates.

Capabilities

A relatively recent discourse in the medical education literature is that of 'educating for capability', which largely asserts that learning outcome and competency frameworks do not adequately reflect the abilities that doctors require in real practice, nor issues of 'transfer' from the teaching environment to clinical practice (De Bere and Mattick 2010; Norman *et al.* 2007; Bolander Laksov *et al.* 2008). It has been defined in various ways, with one paper asserting, "Competency-based assessments were defined as measures of what doctors do in testing situations, while performance-based assessments were defined as measures of what doctors do in practice" (Rethans *et al.* 2002, p901). Whilst this distinction is very clear and accessible, it does not reflect how these terms are used more widely in the literature. Others propose a more contingent view of capability, for example writing "In today's complex world, we must educate not merely for competence, but for capability (the ability to adapt to change, generate new knowledge, and continuously improve performance)" (Fraser and Greenhalgh 2001, p799). This could, however, be viewed as the distinction between two stages on Miller's pyramid. The concept of 'educating for capability' is interesting and likely to gain momentum, but has not yet evolved from semantic and somewhat vague statements into an approach which could be used to define an undergraduate medical curriculum.

7. Core learning outcomes for the undergraduate medical curriculum (topics B+C)

Diverse approaches to the development of learning outcomes can be found in the literature, ranging from opinion pieces from one or more experts up to large scale stakeholder consultations using mixed method research. Having considered the development and significance of learning outcomes in Chapter 1, and the nature, advantages, disadvantages and alternatives to learning outcomes in Part 6 of this chapter, this section explores the range of approaches and methods which can be used to develop core learning outcomes for the undergraduate medical curriculum.

Approaches to learning outcome development

Given the considerable pervasiveness and influence of learning outcomes in medical education, it is perhaps surprising to find they are frequently presented without authors' names and relative contributions clearly indicated. They also often lack details of the provenance and development of each outcome, the literature sources used, and all political and other drivers. As with Harden's (1986) '*Magician approach*' to curriculum development, such learning outcomes may seem appear out of nowhere as 'requirements', 'recommendations' or 'guidelines' like a rabbit out of a hat. Where the authors are acknowledged, they are often a relatively small homogenous groups of experts in one particular field. Harden (1999a) refers to this as the '*Wisemen approach*'. Sometimes the numbers of experts can be very large, as exemplified by the recent development of learning objectives for undergraduate medical education in Vietnam which involved over a thousand medical teachers and other experts (Hoat *et al.* 2007). Harden (1986) defines another thirteen 'approaches to curriculum planning' which also reflect approaches to learning outcome development and so are briefly outlined here. Learning outcomes are increasingly developed by representatives of different stakeholder groups (the '*United Nations approach*'), and groups of students (an example of the '*Consumer approach*'). They are much less commonly developed by a single individual in a position of power (the '*Dictator approach*'), by an individual from outside the institution (the '*Consultant approach*'), or by all potential stakeholders in the curriculum (the '*People's congress approach'*), such as university staff, health service doctors and other groups, current students, recent graduates, potential employers (e.g. government and healthcare managers), patients and other members of the public (Harden *et al.* 1999b). Whilst articles presenting new learning outcomes and competencies frequently discuss issues of regulation (the '*Bureaucratic approach*'), the public image of an institution (the '*Public relations approach*'), curriculum structure and sequence (the '*Railway approach*'), teaching methods and techniques (the '*Mechanics' approach*'), and issues or concerns with the curriculum they seek to replace (the '*Detective approach*'), these are generally presented as influences or contextual information rather than being the single stated approach underpinning learning outcome development. It is most common in the medical education literature to see curriculum plans presented as a broad framework of learning outcomes or competencies around which a programme is structured (the '*Engineering approach*'). It is, however, possible to find examples in the literature of lists of topics or medical conditions to be covered (the '*Cookbook approach*'), and certain values or principles,

such as problem-based learning or integration, dominating curriculum design (the '*Religious approach*'). Dunn *et al.* (1985) also attempted to define different approaches to learning outcome development in medical education and described these as the '*Subject-centred approach*' (similar to Harden's 'Cookbook approach'), '*Task analysis*' of the activities undertaken by programme graduates, '*Study of recent textbooks*', and '*Study of errors in practice*'. These approaches are not mutually exclusive, nor necessarily comprehensive, but they do helpfully illustrate and differentiate some of the common trends in learning outcome development in the medical education literature.

Methods used to develop existing learning outcomes

Many of the approaches described above can be considered as a methodological, and in some cases an epistemological, approach to the learning outcome development. Each could be undertaken using a number of different methods, ranging from relatively informal approaches to curriculum development through to very structured formal research methods. Some articles presenting new learning outcomes in the medical education literature, particularly earlier ones, do not offer details on the methods used in their development (e.g. Ross and Davies 1999). It is, however, possible that such information is available elsewhere. Of the articles which do describe methods used to develop learning outcomes or competencies, those most commonly used are various forms of small group meeting or stakeholder focus group. Examples include the series of working groups used to develop the content of the 'MD2000' curriculum at Brown University (Smith and Dollase 1999), and the focus groups and stakeholder consultations used in the 'ACGME outcome project' (Swing 2007). Sometimes these meetings involve external experts, as in a two-day workshop to define a national outcome-based profile for Mexican medical graduates (Elizondo-Montemayor *et al.* 2007). Some use an existing framework of learning outcomes as a template and focus for discussion, such as The Scottish Doctor framework being used to inform learning outcomes for the University of Barcelona (Palés *et al.* 2004). Specific research methods, such as the 'Nominal Group Technique', have also been used (Crenshaw *et al.* 2011), as have various types of stakeholder survey (Cumming and Ross 2008; Peters and Livia 2006; Koens *et al.* 2005). Rapidly gaining favour and authority over surveys in the medical education literature, however, are various forms of Delphi study in which the opinions of a selected panel of experts are sought multiple times, with the findings of each round informing subsequent rounds (Esmaily *et al.* 2008; Paes and Wee 2008; Rohan *et al.* 2009; Alahlafi and Burge 2005; Tandeter *et al.* 2011; Wilson *et al.* 2007; Burke *et al.* 2009). Learning outcomes may also be informed by semi-structured interviews (Grieve *et al.* 2009; Laidlaw and Harden 1995; Wall and McAleer 2000), critical incident analyses (Dunn *et al.* 1985), documentary analysis of existing outcome frameworks and literature (Dunn *et al.* 1985), and observational studies or 'task analyses' of the work undertaken by graduates (Patterson *et al.* 2008). Mixed method approaches are also relatively common in the literature. Combinations include semi-structured interviews with questionnaires, literature review, and a study of referral letters (Laidlaw and Harden 1995), interviews with literature review, course content analysis and questionnaires (Wall and McAleer 2000), and interviews with questionnaires and four 'rounds' of focus group meetings (Grieve *et al.* 2009).

The majority of existing learning outcomes in the medical education literature do not seem to have been developed using rigorous empirical research. It is anticipated that taking a more critical, collaborative and research-informed approach to learning outcome development might be an effective means to enhance stakeholder engagement, transparency and quality assurance. It is not clear from the literature, however, which research method or methods would be most effective. As one review highlights, "The empirical determination of content has not been widely or systematically attempted", at present "It is not possible, unfortunately, to say whether one method of determining the detailed content is better than any other" (D'Eon and Crawford 2005, p699). In summary, **although intended learning outcomes have been developed in various different ways, there is as yet no single best method or 'gold standard'. Research-informed approaches consulting multiple stakeholder groups and triangulating findings seem to be gaining favour in the literature, as they are likely to enhance stakeholder engagement and acceptability of the resulting learning outcomes.**

Writing learning outcomes in medical education

Hamilton (1999, p125) argues that learning outcomes must be "Wide, long and deep". 'Wide' in scope, so that a small number of learning outcomes describe the breadth of content that graduates should have mastered. 'Long' in time, so that they focus on 'mature professional roles' of the graduate rather than intermediate endpoints. 'Deep' in their ability to stimulate learner engagement, deep learning and personal professional development. Most learning outcomes for the undergraduate medical curriculum which consider professional roles focus on those of recent graduates working as junior doctors in the UK, although some do focus on the end of postgraduate training or CPD, with the undergraduate phase being seen as one part of a 'continuous curriculum' (Jones and Oswald 2001). Most learning outcomes, however, are written with a long timeline to be achieved by the end of a programme of study, rather than by the end of a session or module of a programme. In order to define intermediate endpoints for such long learning outcomes, at the end of a year of study for example, the literature would suggest they should be written in a way that allows the 'level of attainment' (or 'level of mastery') to be described and achieved in a spiral or stepwise manner (Bruner 1960; Harden and Stamper 1999). It would also suggest they should be meaningful and relevant to learners, flexible enough to be learned and taught in a different ways to suit individual and contextual variation, and should allow scope for unplanned and 'emergent' learning outcomes (Hussey and Smith 2003). Also, significantly, the literature would suggest that learning outcomes should not simply be omitted because it is not yet known how best to articulate, learn, teach or assess them. As Prideaux (2000, pp168-169) observes, "Outcomes that are difficult to define or hard to measure, but at the same time are educationally and professionally significant and worthwhile, should not be omitted because of their supposed 'imprecision'". Learning outcomes typically focus on what graduates will be able to do, and so are written in the future tense and contain a verb (McKimm and Swanwick 2009). The language should be clear, simple and ideally concise (Prideaux 2000; McKimm and Swanwick 2009), but many authors are against becoming too focussed on semantics or pre-conceived structures, arguing these distract from more important issues of scope, content, clarity, and engagement of students and staff (Hussey and Smith 2003; Prideaux 2000). Learning outcomes are typically organised into some form of hierarchical framework with increasing 'levels' of detail.

8. Synthesis and gaps identified in the literature

This section attempts to address the research aims by synthesising the existing literature relating to core learning outcomes in teaching for the undergraduate medical curriculum in Parts 1-7 above (topics A + B + C). Gaps in this existing literature are highlighted, situating the current research.

What learning about teaching means

The first aim of this research was '*To explore what learning about teaching as part of the undergraduate medical curriculum means in the UK context*'. Opinions on how novices can learn to teach, and on core learning outcomes in teaching for any programme designed to help them do so, seem to be heavily influenced by individual conceptions of what 'teaching' is. Many different ways of conceptualising teaching have been articulated in the literature, but there is 1) A lack of information on how teaching is conceptualised by those involved in the undergraduate medical curriculum, and 2) A lack of information on how such conceptions might influence their perspectives on what medical students should learn in relation to teaching.

Perspectives on core learning outcomes in teaching

The second aim of this research was '*To seek a range of perspectives on core learning outcomes in teaching for UK undergraduate medical curricula, and to consider potential influences on these perspectives*'. There is a substantial literature on the nature, advantages and potential disadvantages of defining learning outcomes for UK undergraduate medical curricula, and no particular gaps were identified in this area. The literature suggests that teaching is generally considered to be part of the role of senior doctors who have completed or nearly completed their specialist training. It is not known, however, 3) Whether medical students and junior doctors typically recognise this, nor 4) Whether they see teaching as part of their current roles as medical students and junior doctors. Additionally, although reports of junior doctor teaching have been found in the literature, 5) There is a lack of specific research into what teaching recent medical graduates might undertake or be expected to undertake without receiving additional training. Such recent medical graduates might be expected to give the most valuable perspective with regard to the undergraduate medical curriculum having just completed it, and also may be able to reflect on how well it has prepared them for their current role as junior doctors working in the UK.

Synthesis of core learning outcomes in teaching

The third aim of this research was '*To synthesise the findings and consider whether they could be used to develop a research-informed framework of core learning outcomes in teaching for UK undergraduate medical curricula*'. There is a paucity of literature which specifically relates to learning outcomes in teaching for the undergraduate medical curriculum. Differences of opinion can be found in the literature with regard to whether medical students should learn about teaching, and if so what they should learn. It would, therefore, be difficult to articulate a consensus statement on this which stakeholders are likely to feel adequately represents their individual perspectives. 6) Currently there is insufficient data for the development of

a research-informed framework of core learning outcomes for UK undergraduate medical education.

Preferred methods for developing learning outcomes

Although intended learning outcomes have been developed in various different ways, there is as yet no single best way or 'gold standard' method for developing them. Research-informed approaches which involve consultation with multiple stakeholder groups and triangulation of findings seem to be gaining favour in the literature. Various approaches and methods can be found in the literature, as well as guidance on how to construct and phrase learning outcomes, but 7) It is not clear from the literature which methods would be most suitable to inform the development of learning outcomes in medical education.

9. Research Questions

Research questions were written to specifically address the gaps in the literature outlined above through the collection of new research data. These questions are:

1. **How do experts in medical education, medical graduates and current students conceptualise teaching?**

2. **Do medical graduates and students view teaching as part of their developing professional identity as a doctor?**

3. **What learning outcomes in teaching do experts in medical education, recent medical graduates and current students think should be core for the UK undergraduate medical curriculum?**

    a. **How do the perspectives of these three groups compare?**

    b. **Is there a relationship between their perspectives on core learning outcomes and their conceptions of teaching?**

4. **What teaching do recent medical graduates undertake, and what perspective does this offer on core learning outcomes in teaching for the UK undergraduate medical curriculum?**

These research questions are intended to address the first six gaps in the literature identified in Part 8. The seventh gap, around which research methods to use to inform the development of learning outcomes, is explored in Chapter 3.

(this page is intentionally blank)

Chapter 3: Methodology and Methods

Overview

Having outlined the aims in Chapter 1, and the research questions in Part 9 of Chapter 2, this chapter begins by exploring the underlying methodological approach taken in this research. Participants and methods are then discussed, first as a broad overview and then with detailed description of the Delphi study with experts in medical education, interviews with medical graduates, focus group interviews with current medical students, and methods used to compare and synthesise data generated from the three approaches. Alternative approaches, trustworthiness and ethical issues raised by this research are then discussed, followed by a section on reflexivity and the perspective, influences and assumptions of the researcher.

Methodology

This research was primarily approached from the paradigm of Social Constructivism. Creswell describes this paradigm as follows:

> "Individuals seek understanding of the world in which they live and work. They develop subjective meanings of their experiences... These meanings are varied and multiple, leading the researcher to look for the complexity of views… Often these subjective meanings are negotiated socially and historically. In other words, they are not simply imprinted on individuals but are formed through interaction with others (hence social constructivism)" (Cresswell 2003, pp8-9).

Individual conceptions of 'reality', for example the meaning of the term 'teaching' or the role of the FY1 doctor, are thus assumed to be a product of interaction and co-construction with others. There is no expectation of there being a single 'correct' or 'true' meaning of these terms, and so this approach is considered to have a 'Relativist Ontology' (Guba and Lincoln 2005, p195). Knowledge created in this paradigm, such as a list of different forms of teaching undertaken by FY1 doctors or a set of proposed learning outcomes in teaching for the undergraduate medical curriculum, can therefore be considered as "Individual and collective reconstructions sometimes coalescing around consensus" (Guba and Lincoln 2005, p196). This research did not seek to uncover 'facts' or 'universal truths' about teaching or about the undergraduate medical curriculum. Rather it sought to gather a range of subjective perspectives on learning about teaching as part of the undergraduate medical curriculum from individuals who, due to their role and experience, would seem to be most likely to contribute to knowledge in this area. This approach is thus considered to have a 'Subjectivist Epistemology' (Denzin and Lincoln 2005, p24).

Part of the focus of this research was to seek, interpret, and if possible synthesise, perspectives on core learning outcomes in teaching for the undergraduate medical curriculum. It was also, therefore, approached from the perspective of outcomes based education – seeking where possible to articulate and explore whether there was consensus on intended learning outcomes with which to constructively align

teaching, learning and assessment (Harden 2002a; Allan 1996; Biggs 1996). This approach is consistent with a dominant trend in medical education towards outcomes-based education and ensuring that graduates and trainees are 'fit for purpose' (Evans and Roberts 2006; Bleakley and Brennan 2011; Cave *et al.* 2007; Aretz 2011; Wass 2005). There was no expectation of discovering or creating a 'true' or 'ideal' set of learning outcomes in teaching for the UK undergraduate medical curriculum. Nor, in trying to identify what teaching FY1 doctors undertake, was there any suggestion of trying to define what, if any, teaching FY1 doctors 'should' undertake. The purpose was rather to consider learning about teaching as part of the undergraduate medical curriculum from the perspective of preparing graduates for the teaching they might be expected to undertake without further training. Considerable care has been taken throughout this research to minimise researcher assumptions, to avoid misinterpretation, and to present participant meanings, values and voices as faithfully as possible. The entire research process was approached inductively, developing categories and themes from participant data and the literature, and then gradually trying to build these constructively into a rich and multi-faceted representation of participant views and perspectives (Cresswell 1998, pp73-91; Merriam 2009, pp13-18). New findings were interpreted in the light of previous data collected, with meaning constructed from these by the researcher. It has therefore been approached using 'Idiographic' methodology (Cohen *et al.* 2007, pp167-171; Denzin and Lincoln 2005, pp22-25). As a medical graduate specialising in medical education with an interest in this area, however, it was anticipated that the researcher's own prior experience and understanding would inevitably influence all aspects of the research - particularly the interpretation of data and construction of meaning. As Merriam observes, "This is not to say that the qualitative researcher has a blank mind bereft of any thoughts about the phenomenon under study. All investigations are informed by some discipline-specific theoretical framework that enables us to focus our inquiry and interpret the data" (Merriam 2009, p16). The approach has been one of a relative insider asking people who are to varying degrees peers about subjects of mutual interest, trying hard at all times to listen rather than speak. The last section in this chapter provides further background information on the researcher and a reflexive summary of ways in which the research is likely to have been influenced.

The approach to method selection was strongly influenced by the work of Cresswell (2003), in particular his concept of 'Pragmatism' in which research methods and approaches are selected on the basis of 'what works' at the time to address problems arising in real-world contexts. In this way, "For the mixed methods researcher, pragmatism opens the door to multiple methods, different worldviews, and different assumptions, as well as to different forms of data collection and analysis in the mixed methods study" (Cresswell 2003, p12). Charmaz (2006, p121) refers to this as 'Methodological ecumenicalism'. Denzin and Lincoln (2005, p6) refer to such researchers as methodological, theoretical and interpretive 'bricoleurs'. Silverman raises some philosophical misgivings about mixed methods research and the 'triangulation' of data, observing "If you treat social reality as constructed in different ways in different contexts, then you cannot appeal to a single 'phenomenon' which all your data apparently represents" (Silverman 2005, p121). However, the current research specifically recognised this, seeking to explore participant's diverse conceptions of teaching, and their own interpretations of the implications of in terms of learning outcomes. There seemed to be more potential benefits to seeking

different perspectives on this under-researched area than there were risks of inadvertent methodological dissonance, and so the decision was made to proceed cautiously and reflexively in undertaking a mixed method study.

Overview of Participants and Methods

There were three principal considerations when selecting participants for this research, namely that their opinions should be valued by other stakeholders involved in developing undergraduate medical curricula, that they should be sufficiently informed and their opinions have some basis in experience, and that they should be as diverse as possible. Some authors refer to this as seeking 'maximum variation' (Merriam 2009, pp227-8). It was decided that broad categories of participants would be determined first, and then specific methods would be selected which seemed most appropriate for researching the perspectives of those participants on the research questions outlined above. As discussed in the Literature Review, the original Tuning Project presented robust arguments for selecting 'academics', 'graduates' and 'employers' as participants when seeking to gain consensus on learning outcomes for different Higher Education disciplines in Europe (Gonzalez *et al.* 2003; Gonzalez *et al.* 2005). When undertaking the Tuning project for Medicine, however, the value of seeking the perspectives of current 'students' was also highlighted, and it was also found that 'employers' of medical graduates were a difficult group to identify, to reliably distinguish from 'academics', and to engage in the survey (Cumming and Ross 2007b; Cumming and Ross 2008). 'Academics', 'graduates' and 'students' thus seemed to contribute most to the Tuning (Medicine) project, and seemed also to be very appropriate participant groups for the current research.

The three groups of participants selected were: 1) Experts (academics) in medical education responsible for UK undergraduate medical or postgraduate medical education programmes, 2) Graduates of UK undergraduate medical programmes who are in their second year ('FY2') of working in the National health Service, and 3) Students in their final year (Year 5) of a UK undergraduate medical programme. The methods chosen as most appropriate for researching the perspectives of these participants were respectively: 1) An online Delphi study, 2) Individual semi-structured interviews, and 3) Semi-structured focus group interviews. Details of each of these methods and criteria for selection of individual participants are described in detail below.

Current students are both part of the group who are now required by the GMC to learn to teach as part of the undergraduate medical curriculum, and also the most frequent recipients of teaching from junior doctors. They are therefore well placed to offer an informed perspective on what they should learn about teaching, how they could achieve this, and also offer a learner perspective on the teaching currently delivered by FY1 doctors. They are analogous to the final year subset of the Tuning Project 'students'. FY2 doctors are those who are now expected to be able to teach, and are analogous to a subset of the Tuning Project 'graduates' in their second year following graduation. Graduates in their second year of practice were selected to ensure they had a full year of experience from which to base their opinions and draw examples. The term 'experts' in medical education was used in preference to the term 'academics', reflecting the observations in Chapter 2 that a significant proportion of medical education occurs outwith the Higher Education context and so

those responsible often do not refer to themselves as 'academics', although are analogous to this group in the Tuning Project. Those responsible for a UK undergraduate medicine programme were selected because they are expected to ensure that their students achieve all the learning outcomes specified by the GMC in *Tomorrow's Doctors*, and because they have overall responsibility for faculty development and quality assurance of teaching in relation to the undergraduate medical curriculum. Those responsible for a UK postgraduate academic medical education programme were selected because they were considered to be actively involved in academic medical education and in training the academic medical educators and leaders of the future.

1. Delphi study with experts in medical education

Closely following the original Delphi method developed by the RAND corporation (Dalkey and Helmer 1963), and refined by later researchers (Murry and Hammons 1995; Williams and Webb 1994), an online Delphi study was used to research the perspectives of 'experts' in medical education on learning about teaching as part of the undergraduate medical curriculum. A Delphi approach was selected for this group because potential participants were geographically separated, in senior positions with multiple other commitments and time pressures, were thought possibly to have strong opinions on the subject matter, and may have been known to each other already personally or by reputation – increasing the likelihood of 'group bias' and 'dominance' if they interacted face to face (Murry and Hammons 1995). An online survey tool was selected rather than the more traditional postal questionnaire in an attempt to speed up the process and facilitate data collation and analysis.

Participants

Clayton (1997, p378) asserts that "The process of selecting experts is critical to the Delphi and serves to authorise the Delphi's superiority and validity over other less painstaking and rigorous survey procedures". As discussed above, for the purposes of this study, a 'UK expert in medical education' was defined as an individual responsible for either an undergraduate programme in medicine or a postgraduate programme in academic medical or clinical education in the UK. Previous studies have suggested that around sixteen to twenty participants on an expert Delphi panel is ideal (Williams and Webb 1994; Murry and Hammons 1995). It was therefore decided that twenty individuals would be approached in the first instance (10 from each subgroup) to allow for some non-participation and for attrition of numbers between rounds.

The GMC website listed 29 bodies which were entitled to award primary medical degrees in the UK (GMC 2011c). After excluding the researcher's own institution, the ten institutions ranked highest by the Times Online Good University Guide were selected (TimesOnline 2010). The name and contact details of the Programme Director, or other most senior person responsible for each programme, was identified from their most recent Quality Assurance of Basic Medical Education report on the GMC website (GMC 2011h), and their institutional websites. These ten individuals were then invited by e-mail to participate as part of the expert Delphi panel or to nominate a deputy who they felt would be better placed to do this in view of their expertise in relation to the programme. Participants were allocated an identifier in

the order in which they agreed to participate. 'EU01' refers to the first expert responsible for an undergraduate programme, 'EU02' the second, and so on.

Twenty-two UK postgraduate programmes in academic medical or clinical education up to at least Masters level were identified from reviews in the literature (Pugsley *et al.* 2008; Cohen *et al.* 2005; Cusimano and David 1998), from websites advertising postgraduate programmes (e.g. the 'findamasters' website by The Science Registry Ltd 2009), and from searching the internet for 'masters/diploma/certificate' plus 'clinical/medical/health' plus 'education'. After excluding the researcher's own institution, ten programmes were selected at random using a software random number generator. The 'Programme Director' or other individual responsible for each programme was identified from their website, and these ten individuals were invited by e-mail to participate as part of the expert Delphi panel or to nominate a deputy who they felt would be better placed to do this in view of their expertise in relation to the programme. Participants were allocated an identifier in the order in which they agreed to participate. 'EP01' refers to the first expert responsible for a postgraduate programme, 'EP02' the second, and so on.

Methods

The original Delphi method described by Dalkey and Helmer (1963) began with open questions in the first round, although very few examples of this approach can be found in the medical education literature (e.g. Rohan *et al.* 2009). According to Murry and Hammonds (1995), most so-called 'Delphi' research in the literature is better described as 'Modified Delphi', as the first round consists of a predetermined structured questionnaire to be rated or ranked by participants. Although there are many such Modified Delphi in the medical education literature (Tigelaar *et al.* 2004; Howe *et al.* 2007; Paes and Wee 2008; examples include Smith and Simpson 1995; Avery *et al.* 2005; De Villiers *et al.* 2005; Esmaily *et al.* 2008), and they appear to be relatively straightforward compared to the original approach, in many cases the final results seem to closely resemble the initial questionnaire developed by the researchers. For the current research it was therefore decided that the original method, of using a small number of open-ended questions in the first round, be preferable and would reduce the potential for responses to be influenced by the content or form of an initial questionnaire. Free text responses to Round 1 would then be used to inductively develop items to be rated in Round 2, and so on. The online survey tool 'SurveyMonkey' (www.surveymonkey.com) was used for all rounds of the Delphi, and items in the second and subsequent rounds were rated on a seven-point Likert scale as used by Kreber (2002; 2001). A turnaround time for responses of 2 weeks was initially suggested to participants, with follow-up e-mails for late responders. Responses to free text questions were analysed thematically following the principles outlined by Braun and Clarke (2006). Those questions with more conceptual or complex responses were additionally analysed with a three-stage modified grounded theory approach (Charmaz 2006). Likert scale responses were analysed quantitatively in a manner in keeping with the recommendations of Jamieson (2004) and Pell (2005).

Piloting the online surveys

Rounds 1 and Round 2 were first piloted with three colleagues from The University of Edinburgh. One was responsible for the undergraduate medicine programme, one had some responsibility for the Edinburgh MSc in Clinical Education, and the third

was Professor of Higher Education and supervisor of this research. In addition to responding to the questions, these three individuals were also asked to comment on the ease and time required for completion, clarity of wording and structure. The questionnaires were then modified before being made available to the Delphi panel.

Round 1

In Round 1 participants were asked to, '*Please list any learning outcomes relating to teaching which you think are appropriate for the undergraduate medical curriculum (i.e. for medical students to learn)*'. All responses to this question were carefully analysed by the lead researcher using a thematic interpretivist approach, and all suggestions for learning outcomes, topics and recommended experiences relating to teaching were collated. Where appropriate some of these were synthesised to reduce duplication or reformulated as intended learning outcomes. The resulting learning outcomes were grouped thematically, but not hierarchically, before being used as the basis of an online questionnaire for the second and subsequent rounds of data collection. The Delphi panel in Round 1 were also asked a number of other open questions about teaching generally, learning about teaching as part of the undergraduate medical curriculum, and demographic information about themselves. Some of these were analysed thematically, although responses to the question '*What does the term 'teaching' mean to you?*' and '*What does 'learning to teach' mean to you?*', were also analysed using a modified three-stage grounded theory approach involving line-by-line initial coding, focused coding, and then theoretical coding following the method described by Charmaz (2006). A list of questions posed in Round 1 can be found in Appendix 2a, and a screenshot of the online questionnaire in Appendix 2b.

Round 2

In Round 2 the same panel of experts were asked, for each of the learning outcomes derived from the Round 1 responses, to '*Please rate each of the following statements in terms of how strongly you agree that they are appropriate core learning outcomes for undergraduate medical curricula in the UK*'. Learning outcomes were rated on a Likert scale from 1 (strongly disagree) through 4 (neither agree nor disagree) to 7 (strongly agree). They were also asked to suggest any changes or additions to the list of outcomes. Panel responses to Round 2 were analysed quantitatively and the Mean and Standard Deviation for each outcome were calculated. Any suggestions for additional learning outcomes or rewording of existing outcomes were analysed thematically and, where appropriate, incorporated into the questionnaire for Round 3. A screenshot of the Round 2 questionnaire can be found in Appendix 2c.

Round 3 and subsequent rounds

The main purpose of the third and subsequent rounds was to give participants an opportunity to review their responses to each learning outcome in the light of the synthesised responses from the entire expert Delphi panel. Panel members were therefore provided with the Mean (average) and Standard Deviation (spread) of panel responses to the previous round. They were also provided with their own responses to the previous round, and were asked to print and refer to this whilst again rating each statement in terms of how strongly they agree that they are appropriate core learning outcomes for undergraduate medical curricula in the UK on a Likert scale from 1 to 7. Panel members could re-enter the same or different responses as they wished, but were asked to explain in a free text box any responses which were very

different to the panel Mean. They were asked to rate any new learning outcomes which had been added in response to the previous round data, and again to indicate by free text if they felt any learning outcomes should be added, reworded or combined. They were also asked to reflect on expert comments from previous rounds relating to the number and level of learning outcomes resulting from this study, and the similarities and differences between teaching patients and teaching students and trainees. A screenshot of the Round 3 questionnaire can be found in Appendix 2d.

Consensus and stability of responses

Murry and Hammonds (1995, pp429-430) recommend that "The researcher should carefully determine in advance what percentage of panel responses for any item constitutes consensus", and "If consensus cannot be achieved for any questionnaire item, then the study ends when stability occurs". There are, however, no generally accepted standards for defining consensus or stability in a Delphi study (Williams and Webb 1994), and so a judgement was made about these based on the questionnaire structure and available literature. 'Consensus' was defined in advance as a Standard Deviation of less than or equal to 1.0 between the panel responses for any particular learning outcome (consistent with Rohan *et al.* 2009). This was considered to be more appropriate than a minimum percentage agreement on each item (such as the 75% adopted by Tigelaar *et al.* 2004; or the 100% adopted by Williams and Webb 1994), because the use of a seven-point Likert scale would make such high percentages of agreement extremely unlikely. For those learning outcomes not achieving consensus, they were considered to have achieved 'Stability' when the mean panel response between successive rounds differed by less than one point on the seven-point Likert scale (i.e. 14.3%). It was decided in advance that the Delphi would end when all of the items developed from the Round 1 data had achieved consensus or stability and no new learning outcomes or significant changes to existing items were suggested by the Delphi panel. The final list of learning outcomes was then formatted as a single document to be used in the graduate interviews and student focus groups.

2. Interviews with medical graduates

Medical graduates in Foundation Year 2 ('FY2') were interviewed individually for their perspectives on learning about teaching as part of the undergraduate medical curriculum, and also to find out about any teaching they were involved in during the twelve months following graduation. The interviews were conducted using a modified Grounded Theory approach as outlined by Charmaz (2006), and building on the work of Glaser and Strauss (1967). They incorporated many of the principles of effective interviewing outlined by Merriam (2009, Chapter 5) and DiCicco-Bloom and Crabtree (2006).

Participants

FY2 doctors were initially recruited through advertising and distribution of an information sheet at five training events organised for FY2 doctors in the 'South East Scotland' region. Two were tutor-training events for the 'South East Scotland Foundation Doctor Teaching Scheme', and would therefore be likely to attract those most interested in teaching. Three were mandatory core training for FY2 doctors in different hospitals (two central and one peripheral) on various clinical topics, which

were part of a weekly training series which all FY2 doctors working in those hospitals were required to attend. The information sheet (Appendix 3a) included brief details about the research, the NHS ethical and managerial approval secured, and the researcher's contact details – inviting any FY2 doctor to make contact if they were willing to be interviewed. No financial incentive was offered to FY2s to participate. They were, however, offered food and refreshments, a full electronic transcript of the interview, a certificate of participation which they could upload to their ePortfolio or use in Specialist Training applications, and a full report on completion of the study.

The format and initial semi-structured interview schedule was piloted with an FY2 who was known to the researcher, and minor modifications were made iteratively as the interviews progressed. Demographic data were gathered about participants during each interview, as were their suggestions of other FY2s whom they felt might be able to provide a different perspective from them in subsequent interviews. Data were analysed following each interview as described below, and then subsequent participants were purposefully sampled and invited to interview. Purposive sampling was used to ensure as broad a demographic range of participants as possible. No attempt was made to select a statistically 'representative' sample of FY2 doctors, however efforts were made to avoid it being unduly unrepresentative in terms of gender, age, university, the types of hospitals in which they had worked in FY1, and whether or not they had been involved in an organised Foundation doctor teaching scheme. Interviewees were allocated a unique identifier in the order in which the interview took place. 'FY01' refers to the first person interviewed, 'FY02' the second, and so on.

Methods

Once an FY2 had agreed to participate, and had read and asked any questions relating to the information sheet (Appendix 3a), a mutually convenient time and place was agreed and a room booked for the interview. At the start of each interview the researcher confirmed that participants understood the information sheet and were happy to proceed. Written consent was obtained from all interviewees using a standard form (Appendix 3b). All interviews were audio-recorded using a digital recorder and anonymously transcribed by professional transcription services. Recordings were listened to multiple times by the researcher to aid familiarisation with the data, transcription errors were corrected, and then data were analysed and incorporated into the emergent theory. After each interview the interview schedule was reviewed and where necessary modifications were made. The schedule for interview FY06 is presented as a typical example in Appendix 3c. Note that the FY2 doctors were not asked '*What does 'learning to teach mean to you?*' because in the expert Delphi this additional question resulted in very little additional data compared to asking '*What does the term 'teaching' mean to you?*' alone. In the initial pilot interview the respondent was asked to read and comment on the list of learning outcomes derived from the expert Delphi, however their verbal response was somewhat disjointed and difficult to interpret. In subsequent interviews, after responding to the open questions, participants were thus provided with the same list of learning outcomes but were asked to indicate, by means of three tick boxes, whether they thought each one was 'Not Core' (they do not think all medical students should learn it by graduation); 'Core Not Learned' (they think it should be core but didn't learn it themselves as an undergraduate); or 'Core and Learned' (they

think it should be core and did learn it as an undergraduate). A sample page of the Delphi outcome questionnaire used in the FY2 interviews can be found in Appendix 3d. A decision was taken to include data from the pilot interview (FY01) with those of subsequent interviews, because the interview format and data emerging were sufficiently in keeping with subsequent interviews. FY01 was therefore approached again and asked to complete an identical questionnaire to that completed by the other FY2 respondents.

Transcript data from the interviews were analysed by a single researcher in a number of ways, and findings were verified by a second researcher who was supervising the project. Demographic data were extracted and tabled for each interviewee. Other data were analysed thematically through a process of clustering, constant comparison and axial coding (Charmaz 2006; Merriam 2009, Chapter 8; Silverman 2005, Chapter 11; Braun and Clarke 2006), using the software package Nvivo7. Interviewee responses to the question '*What does the term 'teaching' mean to you?*' were first analysed thematically in the same way as the other responses. It became apparent, however, that interviewees responded to this question in such a complex and multi-layered manner that the method needed to be further refined in order to avoid superficial analysis of the data. Responses to this question in each of the transcripts were therefore also analysed using a modified three-stage grounded theory approach involving line-by-line initial coding, focused coding, and then theoretical coding following the method described by Charmaz (2006). Data from the FY2s opinions on the Delphi learning outcomes were analysed quantitatively. The interviews progressed through a process of purposive sampling, interpretation and categorisation of data, building theory to explain the findings, and seeking to saturate theoretical categories thus developed. The overall method was therefore loosely based on the grounded theory approach described by Charmaz (2006).

3. Focus group interviews with current medical students

The focus groups were conducted according to the approach recommended by Cohen *et al.* (2007, pp376-7), with some additional insights regarding their application in medical education from Barbour (2005). Three focus groups of fifth (final) year medical students at The University of Edinburgh were organised to represent broadly those students who had been proactive, typical, and least active in terms of taking-up opportunities to learn about teaching whilst they were a medical student. In the fourth year of the Edinburgh undergraduate medical curriculum, all students are encouraged to participate in one of many Peer Assisted Learning (PAL) projects in which they can gain practical experience teaching their peers and of organising and coordinating teaching (Ross and Cameron 2007; Ross and Cumming 2009). PAL participation is entirely voluntary, and most activities occur outside normal working hours. There are enough places for all fourth year students to get involved if they wish, but currently there are very few other teaching opportunities outside of this scheme in the medical curriculum. Students can choose to participate to help deliver PAL teaching as a 'Tutor', or if they are willing to contribute more time and effort to help develop and coordinate a PAL activity, they may volunteer to be an 'Organiser'. Student involvement in Peer Assisted Learning (PAL) was therefore considered to be a proxy measure for individual enthusiasm and commitment to learning about teaching whilst at medical school. In a recent survey of all fifth year medical students in Edinburgh, with a 53% response rate (128 out of 241 students), 66% (84)

indicated that they had taken part in at least one PAL activity in the preceding year, and 18% (23) that they had been involved in organising at least one PAL activity in the same year. It was decided that homogenous focus groups would be recruited from each of these participant groups, balanced for gender. Hoping to achieve Barbour's (Barbour 2005, p746) ideal of "Enough diversity within groups to stimulate discussion and sufficient homogeneity to facilitate comparison between groups".

Participants

An online invitation notice and information sheet about the research was made available to all (approximately 250) fifth year medical students at The University of Edinburgh via their virtual learning environment 'EEMeC' (Ellaway *et al.* 2003). Interested students were asked to e-mail the researcher, and to include in this e-mail some information about their involvement with Peer Assisted Learning (PAL) in the previous year. Some students who had completed a survey about PAL involvement and had indicated that they would be willing to participate in a research study were also sent an e-mail invitation to participate. The information sheet for medical students included brief information about the research, the ethical and institutional approval, and the researcher's contact details (Appendix 4a). As with the FY2 doctors, no financial incentive was offered to medical students to participate, but they were offered hot food and refreshments during the focus group, a certificate of participation which they could upload to their ePortfolio or use in their Foundation applications, and a full report on completion of the study. Unlike the FY2 doctors, however, they were not offered a transcript of the focus group because it would contain third party data from the other focus group participants. From those who responded to the invitation, student participants were then purposefully selected into three relatively homogenous groups of those who had organised (Focus Group A, 'PAL Organisers'), tutored (Focus Group B, 'PAL Tutors') and not been involved (Focus Group C, 'No PAL') in PAL the previous year. An attempt was then made to recruit five students for each focus group, of mixed gender. Fifth year ('Y5') medical student participants were allocated an identifier depending upon their focus group and the order in which they first spoke on the audio recording. In Focus Group A, 'Y5A1' was the first person to speak, and 'Y5A2' the second. In Focus Group B, 'Y5B1' was the first person to speak, and so on.

Methods

Once the selected medical students had agreed to participate, and had read and asked any questions relating to the information sheet (Appendix 4a), mutually convenient times were arranged for the three focus group interviews. All of these took place in a central university tutorial room in the evening, beginning with around 10 minutes of social conversation, buffet food and refreshments, to help participants relax and build rapport with the researcher and with each other. The researcher then confirmed that participants understood the information sheet and were happy to proceed with the focus group interview, and obtained written consent using a standard form based on the one used for the FY2 interviews (Appendix 3b). The same interview schedule was used in all three focus groups (Appendix 4b). As with the FY2 interviewees, after responding to the open questions, focus group participants were provided with a list of learning outcomes derived from the expert Delphi and were asked to indicate, by means of tick boxes, whether they thought each outcome should be core for UK undergraduate medical curricula, and if so whether they had learned it so far in their

undergraduate studies or not. They were also then asked whether there were any they had marked as 'Core Not Learned' which they thought they would learn prior to graduation. The structure and questions asked in each of the three focus groups was kept broadly similar, and all three were conducted within a two-week period without any additional analysis of the data in-between to facilitate comparison between the three groups. All focus group interviews were audio-recorded using a digital recorder, then uploaded and anonymously transcribed by professional transcription services. Transcripts were listened to multiple times by the researcher to aid familiarisation with the data and to correct the transcripts for errors. Demographic data were extracted and tabled for each group. Transcript data from each of the three focus groups were then analysed thematically using Nvivo7 through a process of clustering, constant comparison and axial coding by a single researcher (Merriam 2009, Chapter 8; Silverman 2005, Chapter 11; Braun and Clarke 2006). As with the FY2 interview data, focus group responses to the question '*What does the term 'teaching' mean to you?*' were also analysed using a modified three-stage grounded theory approach involving line-by-line initial coding, focused coding, and then theoretical coding following the method described by Charmaz (2006). Forms of teaching students reported having received from FY1 doctors were also compared and analysed using a reference framework derived from analysis of the teaching FY2 interviewees reported having delivered. Data from the medical student opinions on the Delphi learning outcomes were analysed quantitatively.

Comparing and synthesising data

This research loosely followed the theoretical and practical procedures for conducting mixed methods research and for combining different forms of research data described by Cresswell (2003). Cresswell differentiates 'Sequential', 'Concurrent' and 'Transformative' approaches to mixed methods research. The 'Sequential' approach, "In which the researcher seeks to elaborate on or expand the findings of one method with another method" (Cresswell 2003, p16), was considered most appropriate for the current research. The Delphi study with experts in medical education was undertaken first, because it was thought that of the three groups they were most likely to be familiar with the existing literature. The Delphi was completed several months before the first FY2 interview, and in turn the FY2 interviews were completed two weeks before the first student focus group. This sequence was also important because each method used some data derived from earlier results. A list of learning outcomes derived from the expert Delphi was rated by the FY2 interviewees and student focus group participants so that the opinions of all three groups on these could be compared. Also the forms of teaching which medical students reported having received from FY1s were compared and synthesised with a reference framework derived from the forms of teaching which FY2 doctors reported having delivered in FY1.

Data from each of the three approaches were compared and synthesised in various ways, and in some cases were re-analysed to show how they address each of the research questions. Expert, FY2 and student responses to the question '*What does the term 'teaching' mean to you?*' were all analysed similarly using a three-stage grounded theory approach (Charmaz 2006). The final stage of theoretical coding was modified, however, so that when discrete theoretical conceptions of teaching emerged from the data these were not combined or modelled separately for each of

the three groups, but rather were compared and mapped to those emerging from the other groups and to conceptions of teaching identified in the literature review. Following the simple approach to textual analysis described by Gill and Griffin (2010), collated responses from all three groups to this question were also uploaded to the online tool 'Wordle™'. After excluding common words (such as 'the' and 'a'), images were created for comparison to provide a visual representation of this textual data, with the size and prominence of words reflecting the frequency with which they appear in the source text (Feinberg 2011). Responses of medical graduates and students about whether they saw themselves as teachers and whether they thought that teaching would be part of their role in ten years were also compared, and common themes identified. The spontaneous suggestions of each of the three groups relating to core learning outcomes in teaching for the undergraduate medical curriculum were compared, and then these spontaneous learning outcomes were mapped and compared to the learning outcomes derived from the Delphi study. It had been hoped that participants' conceptions of teaching and suggestions for core learning outcomes (converted to nominal data) could have been analysed statistically using exploratory factor analysis or a form of inferential regression analysis to address Question 3b (Petrie and Sabin 2000; Fielding and Gilbert 2006; Norman and Streiner 2003, Chapter 16), to determine whether participants' conceptions of teaching (independent variable) had an influence on their spontaneous suggestions relating to learning outcomes in teaching for the UK undergraduate medical curriculum (dependent variable). The numbers of different conceptions of teaching and of learning outcomes in teaching were much greater than anticipated however, and after due consideration and the second opinion of an expert statistician, it was decided that such statistical analysis would be inappropriate. As an alternative, each participant's espoused conception of teaching was compared with the conceptions of teaching implicit in the learning outcomes from the Delphi that they thought should be core for the undergraduate medical curriculum, and with their spontaneous suggestions for learning outcomes, to identify patterns and clustering in the data.

Alternative methodological approaches considered

A number of different methodological approaches, participants and research methods were considered in this research. These are discussed in turn below.

Post-positivism

The medical literature is dominated by quantitative, predominantly post-positivist research (Greenhalgh 1999; Bunniss and Kelly 2010; Schifferdecker and Reed 2009), and to many individuals involved in medical education a large-scale quantitative study might be seen as being more influential and 'scientific' than qualitative studies with smaller numbers of participants (Sackett *et al.* 2000; Paley and Lilford 2011; Goguen *et al.* 2008; Maudsley 2011). However, because the subject of this research is relatively unexplored, it was thought that such a quantitative study would not be sensitive enough to explore individual participants' ideas, conceptions and opinions.

Critical theory

As many of the learning outcome frameworks described in the literature do not explicitly cite any supporting research evidence, and are often developed by powerful organisations using undisclosed methods, it would also have been possible to adopt a critical approach the subject of learning outcome development (Carr and

Kemmis 1986). Such apparent lack of transparency, collaboration and accountability in the development of many outcome frameworks, and the authoritarian top-down manner in which they are sometimes delivered, could have been an ideal subject for discussions of power, control and oppression of students and teachers. However, it was felt that such a direct approach would be unlikely to have the desired long-term impact on learning outcome development generally, and may have been counterproductive. The research priority in relation to the topic seemed to be the identification, interpretation and synthesis of existing literature, and the exploration of key stakeholder perspectives. Care has been taken, therefore, to avoid being overly critical and to avoid making categorical recommendations for practice until such perspectives are better understood.

Alternative participants considered

Same participant groups with 3 different methods

In the early stages of this research project, the idea of directly comparing different methods for gathering data to inform learning outcome development from similar groups of participants was considered. For example, a Delphi, individual interviews and focus groups could have been undertaken with expert participants. Whilst it would be interesting and useful to compare the use of different methods, it was thought unlikely to generate as diverse and rich data as were obtained from triangulating between the three different groups and three different methods.

Other 'experts' for the Delphi

The definition and selection of 'experts' or 'academics' in medical education for the Delphi study could have been different, and this may have influenced the results. One approach considered was to define them as individuals who had been first author on a paper relating to undergraduate medical education in a peer reviewed journal in the preceding two years. This was thought to be imprecise however, and might have included, for example, medical student and Masters projects undertaken by individuals who are either at an early stage in their career or not normally involved in the delivery undergraduate medical education. Another alternative considered was to include Postgraduate Deans and NHS Directors of Medical Education instead of the group responsible for postgraduate programmes in medical education. However, these individuals seemed to have mixed 'employer' and 'expert' roles which would be difficult to differentiate, and also it was thought that individuals working in an academic university context might be more appropriate for the current study.

FY1s or ST1s rather than FY2s

FY1 doctors, with approximately 6 months experience following graduation, and ST1 doctors, with approximately 30 months experience following graduation, were also considered as participants to interview rather than the FY2 doctors with approximately 18 months experience. From anecdotal evidence, teaching experience was thought to be somewhat job-specific however, and with jobs lasting 4 months it was thought that FY1 doctors might not have had sufficiently broad experience of FY1 on which to reflect. The ST1 doctors, on the other hand, might be so removed from the initial transition from medical school into FY1 that they may not be able to remember the detail of what teaching they undertook during that first year after

graduation. FY2 doctors therefore seemed more appropriate than either of these other groups.

Alternative methods considered

Same method with 3 different participant groups

In the early stages of this research project, the idea of directly comparing respondent groups whilst keeping the research method the same was considered. Individual interviews could have been conducted with experts and students as well as FY2 doctors for example. This would have led to more travelling to get to the geographically dispersed expert group, however, and possibly also to inhibition on the part of the students compared to a focus group with their peers. Focus groups could have been undertaken with all participants, however these would have been difficult to coordinate with FY2 shift patterns, and difficult to avoid being dominated by particularly influential medical education experts. In the end priority was given to selecting the most appropriate method for exploring the perspective of each group of participants. It was felt that despite the different methods used, responses from the three groups could be compared if they were asked similar questions, such as '*What does the term 'teaching' mean to you?*', or asked to consider the same material, such as rating learning outcomes derived from the Delphi.

Facilitated online discussion with medical students

There are almost 1,300 medical students at The University of Edinburgh, the great majority of whom routinely and frequently use asynchronous online discussion boards in the virtual learning environment 'EEMeC' (Ellaway *et al.* 2003). These discussion boards have not previously been used for research purposes however. Following ethical approval, a pilot study with final year medical students was conducted in 2009 inviting them to respond to a series of online threaded textual discussions based around similar questions to the student focus group schedule. A new discussion thread was created for each new question, and students were asked to asynchronously post their responses to each question beneath it. Because this was a very new method being piloted, it was not possible to predict student engagement with the process or the quality of data which it would generate. Student engagement with this pilot study was particularly poor, even amongst those known to be enthusiastic with regard to learning about teaching as part of the undergraduate medical curriculum. The method may have future applications, but was not pursued further in this research.

Observational or experiential study

Directly observing FY1 doctors engaged in teaching, and asking them to keep a diary of all teaching undertaken as a form of reflection in and on action (Schön 1983), were also considered in the planning stages of this research. This was rejected for the current study because it was thought the presence of an observer might influence the novice teaching activities of FY1 doctors. Similarly the idea of engaging junior doctors as co-researchers in action research (McNiff and Whitehead 2002) and auto-ethnography (Agar 1980) were considered. Following a brief exploratory discussion with some FY doctors these ideas were rejected for the current study to avoid placing additional pressures and burdens onto what is seen as an already very busy FY1 job. These could, however, be fruitful avenues for future research.

Using fewer or more research methods

Each of the three principal methods used in this research could have been undertaken individually, but to better address the aims of this research, explore different perspectives and critically reflect upon, compare and triangulate the research findings, the combination of different methods was thought to be preferable. As Denzin and Lincoln (2005, p5) observe, "The combination of multiple methodological practices, empirical materials, perspectives, and observers in a single study is best understood, then, as a strategy that adds rigor, breadth, complexity, richness, and depth to any enquiry". More methods could also have been added, but the project then would run the risk of losing focus or becoming unwieldy and unmanageable. Approaching the research questions from the perspectives of three different groups using appropriate research methods for each seemed to be an ideal compromise between these extremes, being suitably broad but still manageable.

Trustworthiness of the research

Denzin and Lincoln (2005, p24) observe that in constructivist research, "Terms such as credibility, transferability, dependability, and confirmability replace the usual positivist criteria of internal and external validity, reliability, and objectivity". This argument may seem somewhat semantic, but the alternative names helpfully distinguish these qualitative concepts from those quite different markers of quality in more positivist scientific research. Merriam's (2009) framework for determining trustworthiness and rigor in constructivist qualitative research has been applied throughout the current research, and her criteria for 'Credibility', 'Consistency' (sometimes known as 'Dependability') and 'Transferability' (sometimes known as 'Generalisability') are discussed below in relation to the current research. These draw heavily on the work of Lincoln and Guba (1985), and also relate closely to similar concepts described by Koch (1994).

Credibility (or 'Internal Validity')

Merriam's (2009, p213) first criterion for determining trustworthiness and rigor in qualitative research is 'Credibility', or as she puts it, "Are the findings credible given the data presented?", and "Are investigators observing or measuring what they think they are measuring?". She recommends five strategies to enhance credibility in qualitative research – triangulation; member checking; saturation; reflexivity and peer review. All of these strategies have been used in the current research to varying degrees. **Triangulation** is evident in the use of three separate groups of participants and methods of data collection, which have then been compared and critiqued against one another to support or challenge emergent findings. **Member checking**, or "Taking data and tentative interpretations back to the people from whom they were derived and asking if they are plausible" (Merriam 2009, p229) is a principle which underpins the Delphi method, as the analysis and interpretation of qualitative and quantitative data is presented back to the participants for comment in each subsequent round. All FY2 interview transcripts were also sent out to participants shortly after the interviews so that they could verify and correct this interpretation of the spoken word as text. On completion, all participants in each of the three groups will be sent a complete copy of this thesis and will be invited to make comments and clarifications on the described methods, findings and conclusions drawn. Such feedback would be incorporated into any subsequent publications. **Data saturation**, or the point where no new substantial information surfaces with further data

collection, was achieved in relation to the research questions before concluding the FY2 interviews. The Delphi was concluded when it achieved a predetermined level of 'data stability', which is a related quantitative concept. More focus groups would be required before the data from them could be said to be 'saturated', however data from these were comparable in many regards, and triangulated well with the FY2 interview data, and so they were considered sufficient for the purposes of the current research. Evidence of **reflexivity**, or critical self-reflection on how the researcher may have influenced the research, can be found in Chapters 1 and 5 and elsewhere in this thesis, and is also the sole focus of the final section of the current Chapter. **Peer review** of various aspects of this research has been an on-going process during all stages of the research with the research supervisor and with other academic colleagues and doctoral students, including informal discussions and review of analyses and written work. Formal presentations of 'research in progress' have been given to other EdD students, colleagues in the Centre for Medical Education, to a group of academics and PhD students in Karolinska Institutet, Stockholm, and as a formal short presentation at the AMEE 2011 conference in Vienna (Ross and Kreber 2011). Such peer review has made an invaluable contribution to this research. Individual contributions are outlined in Acknowledgements.

Consistency (or 'Reliability')

'Consistency' relates to whether the research is repeatable – i.e. if someone were to follow the same methods would they achieve similar results. It is similar to the more positivist concept of 'Reliability', but because research in the social world cannot be controlled in the same way as in a laboratory, no two studies are ever likely to achieve exactly the same results. Instead, Merriam (2009, pp220-3) asserts, in addition to the triangulation, reflexivity and peer review already mentioned, that it is important to keep an 'audit trail' or 'log' of all methods, procedures and decisions taken during the research process. A **research diary** was kept during all stages of the current research. Details of all problems faced, significant decisions taken, and methods used in data collection, analysis and synthesis were carefully documented. The diary and supporting materials were actively interrogated on an ongoing basis whilst the research was in progress to ensure internal consistency and alignment of methods. This was particularly important for ensuring consistency in methods used to analyse data from the three respondent groups at different times. The diary and other materials have also been drawn upon extensively in writing this thesis, particularly in the current chapter and in Results, allowing the reader to follow and critique what was done and why during all stages of the research.

Transferability (or 'External Validity')

'Transferability' relates to the extent to which the findings of this research can be applied to other situations or contexts. Qualitative data are typically not considered to be representative or statistically 'generalisable'. There are various ways in which qualitative findings might be usefully applied in other contexts however, for example through context similarity, pattern recognition or by undermining established 'truths' (Larsson 2009). Merriam (2009, p226) suggests that transferability can be enhanced firstly by providing **'rich thick descriptions'** of the context of the research and any findings, asserting that "The researcher has an obligation to provide enough detailed description of the study's context to enable readers to compare the 'fit' with their situations". Such rich, thick descriptions have been woven in to the current research to facilitate readers in comparing it to their own context, and thus determine whether

the findings are transferable for them. This is most evident in Chapter 2, but is also in Chapters 1, 4 and 5. Merriam also suggests transferability can be enhanced through **'Maximum variation'**, or "Purposefully seeking variation or diversity in sample selection to allow for a greater range of application of the findings by consumers of the research" (Merriam 2009, p229). Efforts to achieve maximum variation are very evident in the design of this research including recruitment of participants from three key stakeholder groups, selection of Delphi participants, purposive sampling of FY2s for interview, and selection of students based on their different PAL experiences for the three focus groups. Involvement of UK medical education experts, junior doctors, and medical students, for example, is likely to facilitate other members of these groups in relating to the research findings and in applying them to their own contexts.

Research Ethics

All aspects of this research were conducted according to the British Education Research Association revised ethical guidelines for educational research (BERA 2004). The ethical implications and potential dilemmas of this research were considered and documented initially by the researcher and supervisor, with additional more formal procedures for ethical approval and institutional permission being followed where appropriate as described below.

Ethical issues considered

All aspects of the research were undertaken with integrity and academic rigor. The researcher remained constantly receptive to external scrutiny and critical feedback from peers, and research participants were treated with appropriate care, respect and gratitude. All participants were informed, at the time of invitation and subsequently, about the nature of the research, the background and motivations of the researcher, and their right to withdraw their participation at any time without explanation or consequence. Information sheets for the FY2 interviews and student focus groups can be found in Appendix 3a and 4a respectively. All participants were capable adults, from whom voluntary informed consent was secured, with care being taken to avoid any unintended coercion. Incentives offered for participation, in addition to the intrinsic rewards of taking part, were appropriate. These consisted of food, non-alcoholic drinks and certificates of participation for the interviews and focus groups, and also a full interview transcript for the FY2 interviewees, and a copy of the entire thesis for all participants on completion. Confidentiality issues were taken very seriously throughout. All data presented in this thesis and elsewhere are anonymous, with only the researcher having access to the identity of individual respondents, which are stored securely with password protection. Because the researcher is registered with the GMC, there were already clear provisions and obligations with regard to the disclosure of any behaviour constituting serious professional misconduct or which might lead to patient harm, and participants were reminded of this in advance. Although The University of Edinburgh supported some aspects of this research and could be considered 'sponsors', and some financial support was received from the Allen and Margaret Wilson Memorial Fund, there were no contractual obligations or undue influence on this research with regard to participants, methods or dissemination.

Formal ethical approval secured

All research involving students in the College of Medicine and Veterinary Medicine at the University of Edinburgh requires formal prior institutional approval, and so an application was submitted to, and approved by, the 'Advisory Committee on the use of Student Volunteers in Experimental Research' (Appendix 5a). An application to the Moray House School of Education Ethics Committee was also completed and signed by the researcher and supervisor for the entire research project involving all three groups (Appendix 5b). This was submitted to the Administrative Officer of the Moray House Research Support Office, who confirmed that as the research was considered to be 'Level 1' in their screening process, it would not require further consideration by formal ethics committee (Appendix 5c). The FY2 doctors were approached because of their position as NHS employees (unlike the Delphi panellists for example who were approached because of their university positions), an application was submitted to the Scientific Officer of the NHS South East Scotland Research Ethics Service regarding the FY2 interviews. After some further correspondence and clarification about the precise nature of the proposed research, a letter was issued confirming that this did not need further formal NHS ethics committee review (Appendix 5d).

Reflexivity

In approaching research from a social constructivist paradigm, Cresswell (2003, pp8-9) asserts, "Researchers recognize that their own background shapes their interpretation, and they 'position themselves' in the research to acknowledge how their interpretation flows from their own personal, cultural, and historical experiences". In this section I outline some of my own prior personal, cultural and occupational experiences and explain how I think these are likely to have influenced the research.

I am currently Programme Co-Director of a postgraduate medical education programme (MSc in Clinical Education at The University of Edinburgh - www.clinicaleducation.mvm.ed.ac.uk). I have been involved in the South East Scotland Foundation Doctor Teaching Scheme since its launch in 2006 (Rodrigues *et al.* 2008), and am responsible for Peer Assisted Learning in the undergraduate medical programme at The University of Edinburgh (Ross and Cameron 2007; Ross and Cumming 2009). I was a medical student at the University of Edinburgh from 1992 to 1998, undertook my Junior House Officer year (now referred to as 'FY1') in peripheral hospitals around Edinburgh, and rotated around a wide variety of different speciality posts during my General Practice (GP) training in Fife (placements considered 'peripheral' to Edinburgh, typically in 'District General Hospitals'). In addition to my academic work I have continued to practise as a GP in Fife since completing my specialist training in 2003.

Although there were no formal Peer Assisted Learning opportunities available whilst I was a student, I did do some informal reciprocal teaching with other medical students and taught English as a foreign language during summer holidays. From around six months into the job as a junior doctor I found myself frequently teaching small groups of medical students and began creating learning resources on the interpretation of chest x-rays and electrocardiograms and other clinical topics. I enjoyed teaching and continued to seek opportunities to teach during my GP

specialist training. In my final year of specialist training I negotiated time to study for a 'Postgraduate Certificate in Medical Education', which raised my awareness of opportunities to get involved in undergraduate medical education and led to my successful application for a part-time post as Fellow in Medical Education at The University of Edinburgh on completion of GP specialist training.

Over the past nine years I have gained a wide range of experience in academic research and development. I was heavily involved in the Tuning Project (Medicine), which sought Europe-wide consensus on core learning outcomes for undergraduate medical education in Europe (Ross and Cumming 2007b; Cumming and Ross 2007b; Cumming and Ross 2008; Ross and Cumming 2007a), and have since had a consultancy role in related projects (e.g. CHARME website 2011; EUROPET website 2008), including one which sought consensus on core learning outcomes for European specialist training in paediatrics (Creusy *et al.* 2011). I am currently a member of the Executive Committee of the MEDINE2 Erasmus-Mundus Thematic Network, and am leading Workpackage 4 which seeks to gain consensus on core learning outcomes for the Bachelor of Medicine in Europe (MEDINE2 website 2011). I am also currently leading Phase 1 of the 'NHS Education for Scotland Faculty Development for Scotland' project, seeking consensus on core competences in teaching for all doctors involved in teaching in Scotland (Scott and Irvine 2010). I have also previously undertaken research on undergraduate medical teaching (Ross and Stenfors-Hayes 2008a; Ross and Stenfors-Hayes 2008b; Ross and Stenfors-Hayes 2009), undergraduate curriculum mapping (Shehata *et al.* 2006; Shehata *et al.* 2007), analysis of policy and practice in medical education (Ellaway *et al.* 2006; Ross *et al.* 2007), and Peer Assisted Learning (Ross and Cameron 2007).

Such experiences will have inevitably shaped, or some might say 'biased', my approach to the current research. The topic I have chosen, the aims I sought to address, the research questions I formulated, the methodology and methods I used to address them, and the conclusions I have drawn, will all have been influenced by my worldview and experiences of learning and teaching as a clinician, educator and researcher. Also I was already known to some of the Delphi panel members through academic conferences and networking, and to some of the local medical students and graduates from my involvement in teaching in Edinburgh, which may have influenced their participation and responses. If someone else had been conducting this research I might have been invited to participate on the expert Delphi panel as Programme Director of a postgraduate programme in medical education, and due to my involvement in curriculum development may even have been delegated by my colleagues to participate on behalf of the undergraduate medical programme. The Edinburgh programmes were therefore excluded from the Delphi panel selection process. I have a degree of situated authority over medical students at The University of Edinburgh, even although I am not currently involved in their assessment. Even local FY1 doctors may perceive some situational power imbalance because of my position in the university and as a local GP. I am likely to have taught many of the current medical students and the FY1 doctors who were local graduates, and may have taught some of them on the subject of learning to teach as part of the training for Peer Assisted Learning or Foundation doctor teaching schemes. Any perceived authority may also have influenced individual participation, responses and even the vocabulary and examples they used. I am likely to have compared participant experiences and opinions with my own personal experiences and

memories of being a medical student and trainee, and this may have led me to falsely assume that I understood participants' experiences or contexts when in fact I did not – or at least not in the way they did themselves.

From my previous research seeking to identify consensus on core learning outcomes I expected there to be multiple perspectives, experiences and contextual differences on the subject of this research, but I did also expect to find some degree of consensus within and between the participant groups studied. I may therefore have artificially separated related perspectives, made assumptions about experiences offered by participants, or found consensus in ambiguous data. I have not approached this research from some Archimedean point of unbiased objectivity.

What I have brought to this research, however, is broad familiarity with the subject area, terminology and context; experience in seeking and interpreting diverse perspectives in complex areas of medical education; experience formulating and gaining consensus on learning outcomes in medical education; a strong desire to seek different perspectives and 'voices' on the subject of this research; and commitment to seeking, interpreting and representing these as faithfully and comprehensively as possible in this thesis.

Chapter 4: Results

Overview

In this chapter the results from the Delphi with experts in medical education, interviews with FY2 doctors, and focus groups with final year medical students are presented sequentially (Sections I, II and III respectively), and then selected results are drawn from all three data sets to demonstrate how each of the research questions have been addressed (Section IV). There were 49 research participants in total, excluding three colleagues who piloted the first two rounds of the Delphi.

I) Delphi with experts in medical education

Delphi expert panel demographics

Five of the ten invited experts responsible for undergraduate medicine programmes agreed to participate themselves, and five nominated deputies who agreed to participate. Seven of the ten invited experts responsible for postgraduate programmes in academic medical education agreed to participate personally, one nominated a deputy who agreed to participate, and two did not respond. The Delphi panel therefore consisted of 18 experts in medical education, ten (EU01 - EU10) in undergraduate and eight (EP01 - EP08) in academic medical education. All eighteen experts completed the Round 1 questionnaire. One (EP04) withdrew after viewing but not completing the Round 2 questionnaire. One (EU02) did not respond to an invitation or reminders to complete the Round 3 questionnaire. Sixteen experts therefore responded to all three rounds of the Delphi.

All eighteen experts indicated that they had been involved in delivering medical / allied healthcare education for more than ten years, and eight (44%) for more than twenty years. Eleven (61%) indicated that they were medically qualified, with eight still practising clinically; four (22%) that their background was in biomedical or social science; and the others in nursing, occupational psychology and education. Most held higher qualifications in medical, clinical or general education, with seven (39%) at Doctoral level, five (28%) at Masters level, and two (11%) at Diploma level. One of the remaining four indicated that they were a Fellow of the Higher Education Academy. Fifteen (83%) indicated that one of their main areas of current activity and responsibility was ‘Undergraduate medical education’; ten (56%) ‘Staff development / postgraduate training in medical education’; nine (50%) ‘Educational research’; three (17%) ‘Postgraduate speciality / GP training’; and two wrote in free text, ‘educational governance’ and ‘support for UK / overseas institutions’. Seventeen (94%) indicated that they regularly read at least one medical education journal, most commonly Medical Education (all 17). Sixteen (89%) indicated that they regularly peer review for journals, most commonly Medical Teacher (72%) and Medical Education (61%). These demographic data reflect positively on the Delphi panel selection criteria, supporting the claim that they constitute a group of UK ‘experts’ in medical education.

Delphi expert panel conceptions of teaching

All members of the expert Delphi panel responded to the question '*What does the term 'teaching' mean to you?*' The analysis is presented with illustrative quotes in Table 4.1. Most experts seemed to have broad multi-faceted conceptions of teaching, encompassing many different aspects of educational practice. One, however, distinguished teaching from other elements of 'education', writing "*I think of teaching as the 'front of house' delivery of knowledge, skills and understanding… By implication, I'm separating teaching from all the other elements that make up education – learning theory, assessment, feedback and appraisal skills, curriculum design, evaluation – although of course teaching will be influenced by an understanding or awareness of these*" (EU01). One expert also distinguished between 'teaching' as a verb or as a noun, "*As a verb teaching is a deliberate act… to initiate, create or facilitate learning… As a noun teaching might refer to the content of a teaching episode or its philosophical or ethical context*" (EP01). The wording of other responses, however, suggested that teaching was predominantly seen as an activity or verb by the other experts. One expert also highlighted that the meaning of the term 'teaching' may change depending on context, "*It depends on the context. Without context to me it means the facilitation of learning*" (EP05).

Theme	Sub-themes	Example quotes
Helping others to learn	Being learner-centred. Ensuring learning is effective. Understanding how people learn. Guiding / leading learners. Helping learners create new knowledge and modify their behaviours.	"*Helping others to learn*" (EU03). "*The process whereby students are assisted to learn new knowledge, skills, competencies and attitudes*" (EU04). "*Leading, instructing, stimulating or encouraging individuals to learn*" (EP07). "*Facilitating the learning process*" (EU09). "*Guide the students so that learning takes place*" (EU07). "*The purpose of teaching is to facilitate learning*" (EU08).
Helping learners define and address their own learning needs	Meeting learner needs. Negotiating and helping learners achieve their aims. Empowering learners. Helping learners take responsibility for their learning.	"*Effective teaching maintains flexibility so that the learners needs are addressed*" (EU07). "*Assessing learning needs, helping the learner address those needs*" (EU10). "*The learner has the main responsibility for learning, and the teacher is there to facilitate that process*" (EP03).
Defining what learners should learn	Assessing learning needs. Constructing learning outcomes and objectives.	"*The construction of learning objectives for the course or individual session*" (EU08). "*Curriculum negotiation (content and process)*" (EP03).

Theme	Sub-themes	Example quotes
Helping learners identify and use opportunities to learn	Suggesting activities. Helping learners apply knowledge. Being opportunistic.	"*Giving advice or suggesting that an individual engages in an activity such as reading or having a particular experience from which learning might ensue*" (EP01).
Imparting knowledge and skills	Giving information. Instructing. Explaining. Sharing information.	"*The sharing of knowledge and skills*" (EU06). "*Imparting knowledge or instructing other people how to do something*" (EU02). "*Teaching can be instructional as in clinical skills training*" (EU05). "*Knowledge sharing / transfer*" (EP03). "*I think of teaching as the 'front of house' delivery of knowledge, skills and understanding*" (EU01).
Engaging learners	Encouraging to learn. Stimulating. Motivating. Inspiring.	"*Engaging learners in active involvement of enquiry and discovery*" (EP06). "*Motivating students to learn (inspiring on a good day)*" (EU09).
Supporting learners	Mentoring. Providing support.	"*The provision of mentoring, support and feedback to learners*" (EU08).
'Being with' learners	Sharing. Having a relationship. Spending time. 2-way interaction.	"*Teaching is 'being with', it is a presence, it is emotionally tiring, it is energy, it is sharing*" (EU05).
Adapting to learners and context	Teaching in context. Being flexible.	"*Effective teaching maintains flexibility so that the learners needs are addressed*" (EU07). "*It depends on the context*" (EP05).
Making resources available	Identifying resources. Producing learning materials.	"*Ensuring… resources are appropriate and available*" (EP08). "*Resource identification*" (EP03). "*The preparation of teaching material (including e.g. study guides, job aids, lecture material, online material, etc)*" (EU08). "*The production of learning materials such as e-learning resources or even just workbooks / handouts*" (EU01).

Theme	Sub-themes	Example quotes
Selecting and using appropriate teaching methods and approaches	Using formal & informal approaches. Lecturing. Tutoring. Delivering skills sessions. Delivering pbl. Delivering e-learning. Encourage self-directed learning.	"*The delivery of teaching using a variety of methods (e.g. lectures, small group discussions, one-to-one instruction, problem based learning, skills sessions, self directed learning, e.learning, etc), as appropriate*" (EU08). "*This may be formal or informal, individual, small or large group*" (EU07). "*Any of a variety of formal or informal, structured or unstructured activities*" (EP07).
Designing learning events and courses	Formulating teaching and learning strategies. Designing courses. Sequencing teaching. Providing learning opportunities and experiences. Planning and implementing teaching.	"*The formulation of teaching and learning strategies… the design of a course or curriculum to achieve intended learning outcomes… the planning and implementation of teaching (including e.g. sequencing of teaching, timetabling, etc)*" (EU08). "*Utilising strategies to facilitate reaching a predetermined outcome*" (EP04). "*Teaching can be defined as any event designed to allow the learner an opportunity to acquire or enhance knowledge or skills*" (EP02).
Assessing learning and giving feedback	Designing assessments.	"*Designing effective assessments (not usually counted as part of teaching, but it should be)"* (EU09). "*The assessment of learners to ensure that the intended learning outcomes are being achieved*" (EU08). "*Assessment and feedback*" (EP03).
Maintaining and enhancing standards	Being responsible. Evaluating. Ensuring content is learned. Quality-assuring. Managing teaching.	"*The development of the course or curriculum… The evaluation, appraisal and quality assurance of teaching… the management and support of the whole teaching process*" (EU08).
Role-modelling	Modelling behaviour. Demonstrating skills. Being an expert. Being a good teacher.	"*Acting as a positive role model*" (EU09).

Theme	Sub-themes	Example quotes
Learning and developing by teaching	Reflecting. Allowing yourself to be changed.	"*Teaching is about changing people and being changed. It can be risky*" (EU05).
Changing others	(none)	"*Teaching… can be much more developmental, reflective and transformational. Teaching is about changing people and being changed*" (EU05).
Establishing a learning environment	(none)	"*The establishment of a suitable learning environment and educational facilities*" (EU08).

Table 4.1 – Analysis of expert conceptions of teaching

Delphi expert panel conceptions of 'learning to teach'

All Delphi panel members responded to the question '*What does 'learning to teach' mean to you?*'. One expressed some difficulty in doing so, "*As difficult as the above! No, it's more difficult because you have the tricky work 'teaching' along with the even trickier word 'learning'*" (EP04). Most referred-to or elaborated on their description of what 'teaching' meant to them, reflecting the themes presented in Table 4.1. Only one new theme was identified in these responses – that of teaching as an innate human attribute. Descriptions of how to learn to teach included developing appropriate knowledge, skills and attitudes towards teaching, understanding how to best help others to learn, and gaining practical experience in teaching. One expanded on this need for experience, stating that it is "*More experiential and developmental than something that can be achieved in a short course. It means peer review, feedback and 'improvement'*" (EU05). One expert also suggested that the meaning may change depending on the content they are learning to teach and the context in which they will teach, writing "*Learning to teach has broad connotations, depending on who is to learn and what has to be taught; how the teaching is to be conducted; and what are the outcomes. There are differences in content, depending on what the trainee teacher needs to teach, and on the level to which they need to learn depending on their involvement in teaching*" (EP05).

Teaching as an innate human attribute

The conception of 'teaching as an innate human attribute' emerged from expert responses, with suggestions that some types of teaching, for some people, may not need to be learned at all. As one expert explained, "*I think that some forms of teaching are probably innate human attributes as children in the playground will spontaneously teach each other games or explain things to each other. In this category I would include telling, explaining and demonstrating*" (EP01). Another wrote that 'learning to teach' was "*A mix of theory and practical tips that can help to improve innate abilities*" (EU03).

Learning outcomes in teaching which experts in medical education think should be core for the UK undergraduate medical curriculum – Delphi Round 1

Overarching LO – medical graduates should be able to teach

When asked if they thought undergraduate medical students should learn to teach, fourteen experts clearly wrote that they should, three gave equivocal responses, and one (who later withdrew) clearly wrote that they should not. Reasons given for all medical students learning to teach included having to teach as an FY1 doctor, having to teach later in their career, being better able to educate patients and other members of the public, helping them become better learners, because the GMC requires it, and for the benefit of more junior students and trainees. As one expert reflected, "*Those best equipped to teach us are often only one or two steps ahead*" (EU07). Some explicitly stated that they considered teaching to be part of the role of a doctor, "*Of course. The word 'doctor' means teacher*" (EP01), and "*The role of the doctor includes that of teacher, both of professional groups (students, juniors, peers and seniors) and patients*" (EP06). One went on to state more strongly that "*Medical students become teachers as soon as they graduate and to expect a junior doctor to start a career without essential skills necessary to perform the multiple roles is both unfair on the doctor teacher and those s/he is expected to teach*" (EU07). Reasons given for all medical students not having to learn to teach mostly related to concerns about curriculum overload and the volume of other content to be learned, as one wrote, "*No I don't. They have enough to deal with in the undergraduate programme*" (EP04). One also expressed concern about teaching being devalued if not taught separately in depth, writing "*Some core skills (appraisal and feedback) need to be taught without the need necessarily to classify this as learning to teach. There is a danger that, if learning to teach is subsumed into general undergraduate medical training, it is devalued*" (EP07). Another, however, argued that "*As with everything else in the undergraduate curriculum, we are not producing specialists and we should be laying the foundations for future development of educational skills*" (EU01).

When asked to interpret the statements relating to teaching from the GMC in *Tomorrow's Doctors* (GMC 2009b; GMC 2003), all indicated that this meant the GMC wanted UK medical schools to ensure that all of their graduates were able to teach to some degree. One elaborated on this, writing "*All medical students must be provided with some formal opportunities to acquire, develop and demonstrate teaching skills during their undergraduate medical education*" (EU08). Some commented on ways in which medical schools might achieve this, and some also on the need for assessment of student ability in this regard. One expert reflected that "*The implications therefore are less about traditional teaching skills and more about being able to give, receive and act on feedback*" (EU04). Several commented on the difficulty they had interpreting such statements from the GMC, with one observing, "*The expected minimum standards for acquiring and assessing teaching skills are not defined by these statements. This leaves the statements very open to interpretation by medical schools*" (EU08). Others felt that the statements did set a standard, but that this seemed to be too high, "*I don't have any arguments with the inclusion of feedback, appraisal etc., but I think that the term "function effectively" sets too high a standard… I think a basic awareness of the skills involved is a more realistic target at undergraduate level*" (EU01).

Detailed LO related to teaching

When asked to "Please list any learning outcomes relating to teaching which you think are appropriate for the undergraduate medical curriculum (i.e. for medical students to learn)", sixteen experts listed varying numbers of learning outcomes, topics or experiences. One other only wrote "*Please look at the outcomes of a good teacher in the Hesketh et al 2001 paper*" (EP05). This paper was therefore analysed (Hesketh *et al.* 2001) and all of the proposed competencies / learning outcomes in teaching described therein were added to those suggested by the other experts. The one expert who did not think undergraduate medical students should learn to teach (EP04) did not list any specific learning outcomes. A small number of additional learning outcomes in teaching for the undergraduate medical curriculum were also identified from expert responses to other questions. Synthesis, grouping thematically under broad inclusive headings, and in some cases reformulating responses as discrete outcomes, resulted in a provisional list of 144 learning outcomes from Round 1 in total (Box 4.1). These were used as the basis for the Round 2 Delphi questionnaire.

Medical graduates will be able to:

Engagement with teaching
Recognise and carry out their obligations in relation to teaching and learning
Demonstrate appropriate teaching skills
Describe what being a teacher means to them
Identify and use informal and unplanned opportunities for teaching
Engage with learners at an appropriate level
Enthuse and motivate learners
Support and encourage learners
Communicate effectively in a teaching context
Be creative and resourceful in their teaching approach

Who is taught
Teach patients
Teach medical students
Teach more junior trainees
Mentor more junior trainees
Demonstrate willingness to teach colleagues
Teach peers / colleagues

Learner-centredness
Adopt a learner-centred approach to teaching
Adopt a constructivist approach to teaching and learning
Facilitate learner self-assessment
Help learners identify their learning needs
Negotiate with students areas to be taught
Help learners find ways to address their learning needs
Help others undertake self-directed learning
Apply their understanding of educational theory and principles
Apply their understanding of how individuals learn
Describe their own learning style
Reflect on their own and others' preferred learning styles

Content to teach
Demonstrate clinical skills
Teach practical clinical skills
Teach decision-making skills
Teach appropriate attitudes

Teaching techniques
Effectively use a range of teaching techniques and strategies
Use a range of questioning techniques in their teaching
Teach using mind maps
Break down complex topics into learning points
Present information in a structured, logical sequence
Explain concepts effectively
Respond appropriately to learner questions
Deal with challenging learner behaviours

Teaching session
Plan a teaching session
Define learning outcomes / objectives for a teaching session
Plan and design learning opportunities
Sequence teaching and learning activities to address learning outcomes
Deliver formal planned teaching
Lead the delivery of a teaching session
Choose appropriate small group teaching methods
Gain audience participation / interaction in a large group presentation
Seek participation from all involved in a teaching session
Evaluate a teaching session

Teaching Situations
Teach effectively in a variety of different situations
Deliver one-to-one teaching
Lead a small group tutorial
Facilitate a problem based learning tutorial
Prepare and deliver a presentation or lecture to a large group
Facilitate experiential **and work based** learning
Teach in clinical situations
Teach at the bedside
Teach in the ward
Teach in outpatient clinics
Teach in the community
Teach in theatre
Teach 'on take'
Teach in a clinical skills unit
Teach at a distance
Organise and run a video or telephone conference

Assessment
Assess formatively
Assess summatively
Devise an appropriate assessment for specified learning outcomes
Write assessment questions
Set appropriate assessment standards
Apply the theory and principles of assessment
Carry out workplace-based assessment (WBA)
Examine in an Objective Structured Clinical Examination (OSCE)
Assess written work and portfolios
Make appropriate use of computers in assessment

Who and what to assess
Assess medical students
Assess more junior trainees
Assess a peer / colleague
Assess knowledge
Assess attitudes
Assess practical clinical skills
Assess reflective abilities
Assess performance in clinical practice

Feedback
Give appropriate academic feedback
Apply the principles of good feedback
Use a variety of techniques & approaches to provide constructive feedback to others
Give feedback to a learner
Give feedback to their colleagues
Give feedback to their teachers

Resources
Identify and make use of appropriate resources for particular learning outcomes
Evaluate learning resources
Prepare teaching and learning materials
Design effective educational texts including handouts, protocols & study guides
Prepare a PowerPoint presentation
Identify and use multimedia resources in teaching, including images & video
Contribute to the preparation of multimedia learning resources
Prepare e-learning / online resources
Make appropriate use of learning technology **and the internet for teaching**
Advise learners on appropriate use of library facilities
Make appropriate use of clinical simulators

Course development
Apply the principles of instructional design
Apply the principles of curriculum planning and development
Apply the principles of outcome based education
Develop and negotiate learning outcomes for an educational programme
Design and develop a course or programme of training
Prepare a learning plan and timescale
Select appropriate teaching and learning strategies for given learning outcomes
Select learners for admission to or progression through an educational programme
Implement a planned course or programme of training

Management of teaching
Appreciate doctor as manager of teaching including quality control
Manage and support teaching
Appreciate the principles of managing change
Ensure environments are adequate for learning
Develop learning environments and educational facilities
Teach to institutional goals
Comply with the teaching recommendations and requirements of the GMC, speciality groups and the university
Interpret and comply with relevant training and assessment regulations
Follow relevant grievance and disciplinary procedures with their learners

Teacher professionalism
Demonstrate appropriate attitudes towards teaching
Teach in an ethical and professional manner
Behave appropriately as a role model
Achieve an appropriate balance between teaching and other commitments
Demonstrate empathy and respect for learners

Working with Colleagues
Contribute to the appraisal of a colleague
Conduct a formal appraisal of a colleague
Demonstrate an appreciation and respect for colleagues
Appreciate the benefits of a multi-professional approach to clinical teaching
Adopt a team-based approach to teaching
Engage in inter-professional teaching

Teacher development
Demonstrate willingness to develop their teaching skills
Critically reflect and learn from teaching and learning experiences
Engage in continuing professional development as a teacher
Engage in the scholarship of teaching
Evaluate and enhance the effectiveness of their teaching
Seek, receive and act on feedback on their teaching
Identify their strengths and areas for improvement in teaching
Take advantage of opportunities to develop their teaching skills
Undertake significant event / critical incident analysis in relation to teaching
Keep abreast of new teaching and learning techniques

Research
Apply the principles of evidence-based medical education
Identify, critique and apply insights from the educational literature
Be familiar with literature sources on medical education
Appreciate the role of teacher as researcher
Encourage high quality research in medical education
Undertake research in medical education

Box 4.1 – Learning outcomes synthesised from Round 1 Delphi data. Learning outcomes in plain text were suggested by experts for the undergraduate medical curriculum, and those in italics arose from their responses to other questions. Learning outcomes in bold arose exclusively from the paper which one expert (EP05) suggested using for this purpose (Hesketh *et al.* 2001).

Delphi Round 2

The calculated Mean (average) and Standard Deviation (spread) of expert responses to each learning outcome in Round 2 are presented in Table 4.2. The Standard Deviation of expert responses to 37 learning outcomes in Round 2 were less than or equal to 1.0 and therefore achieved the predetermined level of consensus. The experts also made a number of free text suggestions for additional learning outcomes and rewording or clarification of existing learning outcomes. These were synthesised into nine additional learning outcomes and modifications to seven learning outcomes, and are indicated in bold italics in Table 4.2. A total 153 learning outcomes therefore formed the basis of the Round 3 questionnaire.

Delphi Round 3

The Mean and Standard Deviation of expert responses to Round 3 of the Delphi, together with responses to Round 2 and details of whether consensus or stability were reached, are presented in Table 4.2. The Standard Deviation of expert responses to Round 3 were less than or equal to 1.0 for a further 21 of the original learning outcomes, and for two learning outcomes added after Round 2. The experts thus reached the predetermined level of consensus on a total of 60 of the 153 learning outcomes by the end of Round 3. No reason was identified for one learning outcome (number 20), achieving consensus in Round 2 but then not in Round 3. Mean expert responses to the remaining 86 learning outcomes developed from the Round 1 data differed by less than one point on the seven-point Likert scale between Rounds 2 and 3, and therefore achieved the predetermined level of stability. No new learning outcomes or significant changes to existing learning outcomes were suggested in the Round 3 responses. The predetermined criteria for ending the Delphi were thus met after Round 3, and no further rounds were conducted. The remaining seven learning outcomes added from the Round 2 responses did not achieve consensus, and would have required a further round to determine if stability would be reached.

LO number		Round 2 Mean of all 17 responses	Round 2 Standard Deviation	Round 3 Mean of all 16 responses	Round 3 Standard Deviation	Consensus (C) or Stability (S) between rounds
1	***Recognise the importance of teaching for their profession and practice***	-	-	6.5	0.7	C
2	Communicate effectively in a teaching context	6.3	0.7	6.4	0.7	C
3	Recognise and carry out their obligations in relation to teaching and learning	6.5	0.8	6.4	0.6	C
4	Support and encourage learners	6.2	0.8	6.3	0.8	C
5	Engage with learners at an appropriate level	6.1	1.0	6.1	0.9	C
6	Demonstrate appropriate teaching skills	5.9	1.0	5.9	0.8	C
7	Enthuse and motivate learners	5.9	1.2	5.9	0.9	C
8	Identify and use informal and unplanned opportunities for teaching	5.6	1.2	5.8	0.7	C
9	Be creative and resourceful in their teaching approach	5.3	1.2	5.4	1.0	C
10	Describe what being a teacher means to them	5.1	1.2	5.1	0.9	C
11	Teach patients	6.4	0.9	6.5	0.6	C
12	Teach peers / colleagues	6.1	0.9	6.3	0.7	C
13	Teach medical students	6.0	0.9	6.2	0.8	C
14	Demonstrate willingness to teach colleagues	6.2	1.0	6.1	1.0	C
15	Teach more junior trainees	5.2	1.4	5.8	1.1	S
16	***Teach nurses and other healthcare professionals***	-	-	5.6	1.2	-
17	Mentor more junior trainees	5.2	1.4	5.3	1.5	S
18	Adopt a learner-centred approach to teaching	6.1	1.0	6.2	0.8	C
19	Help learners find ways to address their learning needs	6.1	0.7	5.9	0.7	C
20	Help learners identify their learning needs	5.9	1.0	5.8	1.2	C
21	Negotiate with students areas to be taught	5.6	1.0	5.8	1.0	C
22	Facilitate learner self-assessment	5.7	1.1	5.5	1.3	S
23	Apply their understanding of how individuals learn	5.1	1.5	5.5	1.0	C
24	Help others undertake self-directed learning	5.5	1.3	5.4	0.7	C
25	Reflect on their own and others' preferred learning styles	5.5	1.5	5.3	1.5	S
26	Apply their understanding of educational theory and principles	4.9	1.6	5.2	1.1	S
27	Describe their own learning style	5.4	1.5	5.0	1.6	S
28	Adopt a constructivist approach to teaching and learning	4.8	1.3	4.8	1.2	S
29	Demonstrate clinical skills	6.8	0.6	6.8	0.6	C
30	Teach practical clinical skills	6.2	0.8	6.4	0.6	C
31	***Teach knowledge-based content***	-	-	6.0	0.9	C
32	***Demonstrate and help learners to develop*** appropriate attitudes (was 'Teach')	5.6	1.3	5.9	1.5	S
33	***Teach communication skills***	-	-	5.6	1.5	-
34	Teach decision-making skills	5.0	1.4	5.1	1.1	S
35	Respond appropriately to learner questions	6.3	0.6	6.3	0.7	C
36	Explain concepts effectively	6.2	0.8	6.1	0.8	C
37	Present information in a structured, logical sequence	5.8	1.1	5.8	1.2	S
38	Effectively use a range of teaching techniques and strategies	5.6	1.2	5.4	1.0	C
39	Break down complex topics into learning points	5.5	1.3	5.4	1.4	S

LO number		Round 2 Mean of all 17 responses	Round 2 Standard Deviation	Round 3 Mean of all 16 responses	Round 3 Standard Deviation	Consensus (C) or Stability (S) between rounds
40	Deal with challenging learner behaviours	5.1	1.7	5.2	1.2	S
41	Use a range of questioning techniques in their teaching	5.4	1.4	5.1	1.2	S
42	Teach using mind maps	3.4	1.6	3.8	1.2	S
43	Define learning outcomes / objectives for a teaching session	6.1	1.1	5.9	0.8	C
44	Evaluate a teaching session ***(from the perspective of a teacher)***	5.9	0.9	5.9	0.8	C
45	Plan a teaching session	5.9	1.2	5.7	1.4	S
46	Lead the delivery of a teaching session	5.4	1.7	5.4	1.3	S
47	Plan and design learning opportunities	5.5	1.5	5.4	1.3	S
48	Deliver formal planned teaching	5.4	1.6	5.4	1.4	S
49	Seek participation from all involved in a teaching session	5.4	1.4	5.3	1.4	S
50	Choose appropriate small group teaching methods	5.1	1.7	5.1	1.2	S
51	Sequence teaching and learning activities to address learning outcomes	4.9	1.8	5.0	1.4	S
52	Gain audience participation / interaction in a large group presentation	4.7	2.0	4.8	1.6	S
53	Deliver one-to-one teaching	5.9	0.8	6.0	0.5	C
54	Teach in clinical situations	5.8	1.1	5.9	0.9	C
55	Teach at the bedside	5.7	1.1	5.9	1.0	C
56	Teach on the ward	5.6	1.3	5.9	1.0	C
57	Teach in a clinical skills unit	5.8	1.0	5.5	0.7	C
58	Teach 'on take'	5.6	1.2	5.4	1.1	S
59	Teach in outpatient clinics	5.1	1.6	5.3	1.1	S
60	Lead a small group tutorial	5.4	1.5	5.3	0.9	C
61	Facilitate experiential and work based learning	5.4	1.7	5.2	1.6	S
62	Teach effectively in a variety of different situations	5.1	1.6	4.9	1.3	S
63	Prepare and deliver a presentation or lecture to a large group	5.1	1.9	4.9	1.5	S
64	Teach in the community	4.9	1.8	4.9	1.6	S
65	Facilitate a problem based learning tutorial	4.4	1.6	4.4	1.4	S
66	Teach in theatre	4.5	1.7	4.1	1.4	S
67	Teach at a distance ***(i.e. use distance learning approaches to teaching)***	3.4	1.7	3.7	1.5	S
68	Organise and run a video or telephone conference	2.9	1.6	3.0	1.6	S
69	Assess formatively	5.4	1.6	5.7	0.9	C
70	Carry out workplace-based assessments	5.0	1.7	5.1	1.1	S
71	***Make a global judgement about performance***	-	-	4.8	1.6	-
72	***Monitor student progress and achievement of learning outcomes***	-	-	4.7	1.4	-
73	***Assess performance using a mark scheme***	-	-	4.6	1.3	-
74	Assess summatively	4.4	2.0	4.6	1.6	S
75	Write assessment questions	4.2	1.8	4.6	1.2	S
76	Examine in an Objective Structured Clinical Examination (OSCE)	4.2	1.6	4.4	1.2	S
77	Devise an appropriate assessment for specified learning outcomes	4.1	1.9	4.3	1.5	S

LO number		Round 2 Mean of all 17 responses	Round 2 Standard Deviation	Round 3 Mean of all 16 responses	Round 3 Standard Deviation	Consensus (C) or Stability (S) between rounds
78	Assess written work and portfolios	3.9	1.9	3.9	1.4	S
79	Set appropriate assessment standards	3.6	1.8	3.6	1.5	S
80	Apply the theory and principles of assessment	3.6	1.8	3.6	1.5	S
81	Make appropriate use of computers in assessment ***(i.e. using computers in the assessment of others)***	3.6	1.8	3.8	1.5	S
82	***Participate in a formal Board of Examiners***	-	-	3.0	1.7	-
83	Assess practical clinical skills	5.1	1.5	5.1	1.1	S
84	Assess medical students	5.2	1.6	5.0	1.2	S
85	Assess performance in clinical practice	5.2	1.6	5.0	1.0	C
86	***Assess behaviours***	-	-	5.0	1.2	-
87	Assess a peer / colleague	5.0	1.5	4.9	1.1	S
88	Assess attitudes	4.8	1.8	4.7	1.4	S
89	Assess more junior trainees ***(does NOT imply medical students should practise by teaching junior doctors)***	4.8	1.5	4.7	1.1	S
90	Assess knowledge	4.8	1.7	4.5	1.4	S
91	Assess reflective abilities	3.9	1.6	4.0	1.2	S
92	Give feedback to their teachers	6.1	0.7	6.1	0.6	C
93	Give feedback to a learner	6.1	0.9	6.0	0.7	C
94	Apply the principles of good feedback	6.1	1.2	5.9	0.9	C
95	Give feedback to their colleagues	6.0	1.1	5.9	1.0	C
96	Give appropriate academic feedback ***(includes all aspects of performance such as skills, knowledge & behaviours)***	5.6	1.2	5.6	1.0	C
97	Use a variety of techniques & approaches to provide constructive feedback to others	5.5	1.5	5.4	1.1	S
98	Prepare a PowerPoint presentation	6.4	0.9	6.4	0.6	C
99	Identify and make use of appropriate resources for particular learning outcomes	5.4	1.5	5.6	1.0	C
100	Prepare teaching and learning materials	5.4	1.0	5.4	0.8	C
101	Advise learners on appropriate use of library facilities	5.1	1.6	5.1	1.1	S
102	Evaluate learning resources	4.9	1.6	5.0	0.9	C
103	Make appropriate use of learning technology and the internet for teaching	4.5	1.7	4.9	1.4	S
104	Identify and use multimedia resources in teaching, including images & video	4.6	1.3	4.8	1.2	S
105	Make appropriate use of clinical simulators	4.9	1.4	4.6	1.1	S
106	Design effective educational texts including handouts, protocols and study guides	4.2	1.5	4.4	1.3	S
107	Contribute to the preparation of multimedia learning resources	4.2	1.7	4.4	1.7	S
108	Prepare e-learning / online resources	3.5	1.7	3.6	1.6	S
109	Prepare a learning plan and timescale	4.8	1.6	4.8	1.2	S
110	Apply the principles of outcome based education	4.2	1.6	4.1	1.1	S
111	Select appropriate teaching and learning strategies for given learning outcomes	4.3	1.7	4.0	1.7	S
112	Develop and negotiate learning outcomes for an educational programme	3.6	1.7	3.3	1.2	S
113	Apply the principles of instructional design	3.6	1.7	3.3	1.6	S

LO number		Round 2 Mean of all 17 responses	Round 2 Standard Deviation	Round 3 Mean of all 16 responses	Round 3 Standard Deviation	Consensus (C) or Stability (S) between rounds
114	Apply the principles of curriculum planning and development	3.7	1.8	3.2	1.3	S
115	Design and develop a course or programme of training	3.5	1.5	3.2	1.2	S
116	Implement a planned course or programme of training	3.7	1.8	3.0	1.5	S
117	Select learners for admission to or progression through an educational programme	3.1	1.8	2.8	1.5	S
118	Comply with ***relevant*** teaching recommendations and requirements ***(e.g.*** GMC, speciality groups & university***)***	5.0	2.1	5.1	1.1	S
119	Interpret and comply with relevant training and assessment regulations	4.6	2.1	4.7	1.5	S
120	Follow relevant grievance and disciplinary procedures with their learners	4.2	2.2	4.6	1.5	S
121	Teach to institutional goals	4.7	1.8	4.4	1.6	S
122	Appreciate doctor as manager of teaching including quality control	4.4	1.4	4.1	1.4	S
123	Appreciate the principles of managing change	4.2	1.7	3.8	1.4	S
124	Ensure environments are adequate for learning	4.4	2.0	3.8	1.6	S
125	Manage and support teaching	3.8	1.6	3.6	1.4	S
126	Develop learning environments and educational facilities	3.2	1.8	3.0	1.5	S
127	Demonstrate an appreciation and respect for colleagues	6.8	0.7	6.8	0.5	C
128	Appreciate the benefits of a multi-professional approach to clinical teaching	6.2	0.9	6.2	0.8	C
129	Adopt a team-based approach to teaching	5.8	1.5	5.6	1.1	S
130	Contribute to the appraisal of a colleague	5.3	1.6	5.4	1.0	C
131	Engage in inter-professional teaching	5.4	1.6	5.2	1.1	S
132	Conduct a formal appraisal of a colleague	3.3	2.0	3.2	1.7	S
133	Behave appropriately as a role model	6.7	0.6	6.8	0.4	C
134	Teach in an ethical and professional manner	6.6	0.6	6.7	0.5	C
135	Demonstrate empathy and respect for learners	6.6	0.6	6.6	0.6	C
136	Demonstrate appropriate attitudes towards teaching	6.5	0.8	6.6	0.6	C
137	Achieve an appropriate balance between teaching and other commitments	6.4	0.9	6.3	0.8	C
138	Seek, receive and act on feedback on their teaching	6.6	0.7	6.6	0.5	C
139	Identify their strengths and areas for improvement in teaching	6.5	0.9	6.5	0.6	C
140	Critically reflect and learn from teaching and learning experiences	6.5	0.6	6.5	0.6	C
141	Take advantage of opportunities to develop their teaching skills	6.2	0.9	6.2	0.5	C
142	Evaluate and enhance the effectiveness of their teaching	6.3	0.8	6.2	0.7	C
143	Demonstrate willingness to develop their teaching skills	6.3	0.8	6.1	0.8	C
144	Engage in continuing professional development as a teacher	5.6	1.9	5.8	1.0	C
145	Undertake significant event / critical incident analysis in relation to teaching	5.4	1.7	5.3	1.6	S
146	Keep abreast of new teaching and learning techniques	5.0	1.7	4.9	1.2	S
147	Engage in the scholarship of teaching	4.3	2.1	3.8	1.8	S

LO number		Round 2 Mean of all 17 responses	Round 2 Standard Deviation	Round 3 Mean of all 16 responses	Round 3 Standard Deviation	Consensus (C) or Stability (S) between rounds
148	Apply the principles of evidence-based medical education	4.8	2.0	4.5	1.5	S
149	Encourage high quality research in medical education	4.5	2.0	4.4	1.7	S
150	Appreciate the role of teacher as researcher	4.5	2.0	4.3	1.5	S
151	Identify, critique and apply insights from the educational literature	3.6	1.9	3.6	1.4	S
152	Be familiar with literature sources on medical education	3.8	2.2	3.4	1.7	S
153	Undertake research in medical education	2.9	1.9	3.0	1.5	S

Table 4.2 – Summary of Mean and Standard Deviation of expert rating of learning outcomes in Round 2 and Round 3 of the Delphi. Outcomes which were added, reworded or clarified (in brackets) following Round 2 are indicated in bold italics. The final column indicates whether the pre-determined level of consensus (C) was achieved, and if not whether the pre-determined level of stability (S) between Rounds 2 and 3 was achieved.

Delphi expert panel comments on the research

Expert responses to the question, '*Do you have any other comments or suggestions on the subject of this research or the way in which it is being done?*' in Round 1 were all positive and encouraging. Examples include "*It is fine – and very exciting*" (EU05), "*Good luck with this important study*" (EP05), and "*No, but interesting topic and will look forward to the final results!*" (EU01). In Rounds 2 and 3 there were still positive encouraging comments, but some experts seemed concerned about the large number of learning outcomes. Comments included, "*In my view some of your [respondents] have an optimistic view of what students can reasonably achieve in the UG course with all the competing pressures*" (EU09, Round 3), and "*The UG curriculum is crowded so very careful thought needs to be given to the number of outcomes that can be achieved and of course the amount of assessment time that would have to be devoted to them*" (EP01, Round 3). The one expert (EP04) who withdrew after viewing but not completing the Round 2 questionnaire, and who had previously stated that they did not think medical students should learn to teach, commented by e-mail that they did not agree with the wording of the learning outcomes or the assumptions underpinning them. When asked in Round 3 to reflect on an expert comment about 'teaching patients', most experts seemed to view teaching patients and teaching students or trainees as different activities which had some features in common. One wrote, "*I remain uncomfortable with the idea of 'teaching' patients. To me it feels a qualitatively different outcome from teaching colleagues/students etc… focused on helping the patient to understand more about something (e.g. their condition, preventive care, treatment options)*" (EP03). When asked in Round 3 to reflect on concerns expressed in previous rounds about the number and level of learning outcomes resulting from this study, responses

suggested that most of the experts shared these concerns to some extent. Some suggested the list of learning outcomes could be further condensed, although no suggestions were offered as to how. Some suggested they be prioritised to prepare graduates for any teaching they are likely to undertake, "*The emphasis should be on basic teaching situations that they are likely to encounter*" (EP07). A number of experts argued that the list was reasonable but the level of proficiency with which the learning outcomes must be achieved should be more clearly indicated, "*To take into account the degree to which medical graduates are expected to demonstrate these skills. Again this is a lifelong process and whilst these outcomes seem advanced when presented in this form, I would argue that the students who undergo basic teaching skills training at our medical school graduate with competence in these areas*" (EU07). One reflected that experts were perhaps not the best group to decide on undergraduate learning outcomes on their own, "*I'm more anxious about the number than about the level of the outcomes as written… but again medical educators may not be the ideal group to make that decision as our idea of 'straightforward' outcomes may be pretty challenging for less experienced educators*" (EP03). Despite the experts not being aware of the other methods being used in this research, one also commented, "*Very interesting – thanks for involving me. I wonder to what extent the views of this panel match with those of a wider population including medical students, trainees and patients. All interesting things for later research*" (EP03).

II) Interviews with FY2 doctors

Nineteen FY2 doctors participated in individual interviews lasting between 40 and 70 minutes. The majority were conducted in a central hospital or university location, although some were in peripheral hospitals. All interviewees were e-mailed a full transcript of their interview to check for accuracy. Two replied with minor corrections, which were made. Interviewees did not identify any other misunderstandings in the transcripts, nor ask for any to be excluded from the research.

FY2 Interviewee Demographics

Eleven of the nineteen FY2 doctors interviewed were female and eight male. They aged between 23 and 31 years (median age 25 years). Two were graduate entrants, one having previously studied and worked for 18 months as a dietician, the other having previously studied philosophy. Twelve had studied undergraduate medicine exclusively at The University of Edinburgh, six exclusively at other UK universities, and one had studied for the first three years at another UK university before transferring to Edinburgh for the last three years. Other UK universities at which interviewees had studied were the Universities of Aberdeen, Dundee, Cambridge, Oxford, Southampton and Leicester. A minority also mentioned having undertaken an 'intercalated degree' (taking a year out of the medicine programme to join the final year of a related science or social science programme and graduate with a Bachelors degree in that discipline). Seventeen interviewees had begun their Foundation training in August 2009, and two started four and eight months earlier due to atypical graduation times. All interviewees reflected on their first full year in the Foundation programme when responding to questions about their FY1 experiences however.

All interviewees had undertaken three posts in FY1, each in a single hospital and lasting four months. Due to purposive sampling the interviewees had a broad range of experience with regard to posts in central hospitals (large university hospitals in a major city) and peripheral hospitals (smaller general hospitals in large towns). One interviewee had undertaken three central posts, eight had undertaken two central and one peripheral post, eight had undertaken one central and two peripheral posts, and one had undertaken three peripheral posts. Each interviewee had undertaken at least one medical post (either general, acute or elderly medicine), one surgical post (general surgery or less commonly plastic surgery), and one other post (either a medical speciality, surgical speciality, or psychiatry). None of the interviewees had undertaken a post in general practice in FY1, although many later had in FY2.

FY2 conceptions of teaching

FY2 interviewee responses to the question '*What does the term 'teaching' mean to you?*' varied considerably in the length of response, the number of dimensions or aspects of the response, and in the types of conception described. A thematic analysis of the nineteen responses with illustrative quotes is presented in Table 4.3.

Theme	Sub-themes	Example quotes
Helping others to learn	Encouraging to learn. Helping others learn faster or better. Showing how to gain knowledge. Teaching as would like to be taught.	"*Accelerating the learning of others – i.e. making it more time efficient… better and more accurate*" (FY01). "*Facilitating their learning rather than doing it for them*" (FY05). "*Enhances their own knowledge and skills, and maybe attitudes as well*" (FY15).
Helping learners gain independence	Helping learners gain confidence; think for themselves; do things; and become qualified. Provide a foundation to build upon.	"*Giving people the confidence to believe in what they already know*" (FY01). "*Teaching them to think for themselves about the topics they are learning*" (FY04). "*In order to become fully qualified… you need training*" (FY12). "*Nurturing that person*" (FY09). "*Teach them how to gain those facts themselves by, well, looking it up I suppose*" (FY13).
Engaging learners in dialogue	Listening to learners. Giving opportunity to ask questions. Giving time. Interacting.	"*It's very much dialectical… a process between you and the people or person that you're teaching*" (FY05). "*I think a teaching setting's nicer if there is discussion and you can understand what the students are thinking… and if they've also go the opportunity to ask questions. So I think teaching's two way*" (FY11). "*The process has to be interactive rather than didactic*" (FY17).
Sharing experience	Helping those less experienced. Giving examples. Providing perspectives. Giving your view or opinion on subjects.	"*A lot about what you can teach people is from your own experience, and everyone has different experiences, and that's why it's good to have a whole range of teachers in medicine*" (FY09).

Theme	Sub-themes	Example quotes
Imparting knowledge and skills	Passing on skills; knowledge; and established practices.	"*Imparting knowledge and skills*" (FY19). "*Imparting of knowledge to a younger, less experienced body of people*" (FY03). "*Passing on information, expertise, experience to other people*" (FY07). "*Giving people knowledge that I've got and they haven't necessarily*" (FY10). "*Information giving*" (FY09).
Packaging information	Explaining. 'Distilling' information. Covering topics. Consolidating things. Helping others memorise.	"*Giving other people a structure for learning, and explaining*" (FY02). "*I've sort of distilled the subject into a way that I understand it, and being able to pass it on to somebody else, and for them to see it in the light that I see it*" (FY06). "*Giving them the sort of logical framework… and enough of the basic facts to read further*" (FY04).
Generating interest and enthusiasm		"*Generating an interest or enthusiasm about something*" (FY19). "*Encouraging people you're teaching to broaden their knowledge and experience*" (FY08).
Modelling behaviour	Modelling behaviour in wards / clinic. Behaving well towards patients. Allowing learners to shadow.	"*You teach a lot through your behaviour towards patients, your behaviour in clinics, your behaviour on ward rounds*" (FY12). "*Shadowing someone for a day or a week, where you can pick up stuff*" (FY18).
Checking understanding	Finding out what learners are thinking. Picking up on areas they don't understand. Filling in gaps.	"*They might not all understand what you say, and perhaps if you have this informal session and discussion group you can pick up on something that the student doesn't understand and there's time to go over that*" (FY11). "*Helping to fill those holes in*" (FY17).

Theme	Sub-themes	Example quotes
Undertaking a range of different activities	Lecturing. Tutoring small groups. Training. Ward and bedside teaching.	"*Teaching can be on the ward, and you can do small group teaching. I could either speak to the students in a formal setting or we could have an informal session*" (FY11). "*Sharing of knowledge, skills and experience… probably through a number of different means*" (FY16).

Table 4.3 – Thematic analysis of FY2 conceptions of teaching.

Extent to which FY2s view teaching as part of their developing professional identity as a doctor

Do FY2 interviewees currently see themselves as teachers?

FY2 interviewees gave mixed responses when asked whether they saw themselves as a teacher at the moment. Eleven unequivocally said 'yes', four unequivocally said 'no', and four gave qualified responses. Those who said they did see themselves as a teacher often qualified in some way, for example "*Yes, in an informal way*" (FY19), and "*I guess so, but only on a very small scale*" (FY17). One response suggested the interviewee saw being a teacher as an active role in which they sought opportunities to teach, "*Yes. I think I consider myself as a teacher, sometimes informally and sometimes formally at a formal tutorial or teaching that's structured. Often informally on a ward. I try to take quite an active role in mentoring and teaching groups of students that come through departments where I work*" (FY16). Those who said they did not see themselves as a teacher nevertheless all highlighted that they did do some teaching, as one said "*No. I see myself as someone who does some teaching, but I wouldn't really see myself as a teacher*" (FY02). Most highlighted that their role was primarily clinical, "*Not really. I see myself as a doctor who occasionally does some teaching*" (FY10). One elaborated on this by saying, "*If I was asked what I do just now by a layperson… I wouldn't bring up teaching as part of my job description. I think the way the foundation curriculum is structured, you are mainly a service provider*", but then went on to say "*If I was talking to someone medical… I might bring up other things I do, which might include a bit of teaching*" (FY18). Those responses considered to be equivocal reflected interviewees saying that they sometimes felt like teachers. This could depend on what they were doing from day to day, "*Occasionally I suppose I'd see myself as a teacher*" (FY04), or from job to job, "*In this job, no not really. In other jobs it's been a bit different*" (FY08). Some also talked about feeling like a teacher in a different role outside medicine, such as a youth organisation, swimming or ballet dancing lessons.

Factors contributing to FY2 interviewees seeing themselves as teachers

When asked when they first saw themselves as a teacher, or what it would take for them to see themselves as a teacher, interviewee responses fell into five emergent themes. Firstly, some interviewees saw, or would see, themselves as teachers because they were involved in teaching. For some this was involvement in any amount of teaching, and for others there seemed to be a threshold of volume or time spent teaching which had to be exceeded, as one said, "*I think I'd need to spend more time doing it*" (FY02). Secondly, for some it related to being expected to teach. This could be a formal responsibility they associated with their job, "*I do see it as part of my responsibility, and if I could I would do much more on the wards*" (FY17), or a perceived or self-imposed responsibility, "*It's not a structured commitment, it's an 'as I'm able to do in my free time' to teach things*" (FY18). In general, however, it was not perceived as their main responsibility, "*It's part of my role, but again I don't think it's particularly the main one or focus of it*" (FY15). Thirdly, some interviewees saw themselves as teachers because they considered teaching to be part of the role of a doctor, "*I do think it's part of the role of every doctor*" (FY09). Thus, when they graduated as a doctor they also considered themselves to be a teacher, "*I started seeing myself as a teacher when I, probably when I became a doctor*" (FY01). Even many of those who taught as undergraduates seemed to perceive graduation as being significant to their identity as a teacher, "*I felt a bit of a fraud there. I don't know if I would have thought of myself as much of a teacher then. I would probably say I felt like I was a teacher… after I graduated last year*" (FY07). Fourthly, some interviewees saw, or would see, themselves as teachers when they felt they had sufficient knowledge and experience related to the content they would teach. Some felt that they had gained sufficient knowledge and experience during their undergraduate studies, "*Third year I was just kind of dabbling in it, and then the fourth year was when I really started feeling that I could start passing on some form of significant knowledge*" (FY06), whilst others still felt they were not yet knowledgeable or experienced enough, "*I tend to think of a teacher as knowing everything and being confident in what you say. I see myself more as a junior doctor helping the students out. I see consultants and senior registrars as teachers. They have the experience*" (FY11). Many of the interviewees focused on the importance of knowing enough to be able to teach, often down-playing their own role in helping others learn, "*I don't see myself as a teacher because I don't think I know enough to be a teacher… I see people such as the professors as teachers. I just occasionally try to help people a little with what they're not understanding*" (FY10). Fifthly some interviewees saw, or would see, themselves as teachers when they had learned how to teach. One explained, "*Probably just learning a little bit more, being taught myself as to the concept of teaching and different approaches and styles that might be helpful to use*" (FY05). Another combined this with the fourth theme in saying, "*I feel rather too ignorant to be a good teacher – with regards to how to teach and also the knowledge behind what I'm teaching*" (FY05).

Would FY2s like to be involved in teaching in 10 years?

When asked what sort of doctor they would like to be in ten years, most interviewees started by describing the clinical area in which they would like to specialise. Some already had a detailed plan of what they would like to do, "*I'd quite like to be an academic military intensivist in the Royal Air Force*" (FY04). Others seemed undecided "*In ten years' time I would like to be full-time in whatever path I go down,*

so GP or consultant" (FY19). Eleven of the nineteen interviewees spontaneously mentioned that they would like to be involved in teaching, and when asked the remaining eight said they would also. Some may have been influenced by the knowledge that the interview was to be about teaching however. Interviewees seeking a career in general practice were no different to those interested in becoming a hospital consultant. One interviewee said, "*I really enjoy teaching and have quite a strong interest in it… I think it's very important, as a doctor, to do teaching; and I would like to continue teaching medical students, and hopefully trainees in due course as I become more senior*" (FY16). Another echoed this comment in saying, "*I always think of that as part of the role of the doctor anyway. You've got all these different roles within your day to day work, and that teaching, yes definitely, would be one of them*" (FY09). Some did not seem so enthusiastic about teaching however, with one reflecting, "*I didn't become a doctor to become a teacher, but I do see it as an important part of that*" (FY15), and another, "*It seems that the teaching is becoming more and more of an aspect of the consultant's life these days, so I imagine I will be doing teaching whether I like it or not*" (FY03).

When asked to indicate what proportion of their job in ten years they would like as teaching, interviewee responses ranged from once or twice a week to over half of their job. As one reflected, "*I think you're always teaching in some way… So I think teaching would be over 50% of what you do*" (FY09). Some said they would teach more if the teaching was varied, interesting or more formal. Examples include, "*It kind of depends what kind of teaching it would be. I suppose if it was varied – if it was bedside and tutorials and things, maybe three of four times a week*" (FY07), and "*Some formal interesting teaching as opposed to just ad hoc stuff*" (FY18). All highlighted that they would like to teach more junior trainees, and most would also like to teach medical students. The types of teaching they envisaged delivering included informal teaching as part of their usual practice, "*Whether it's formal and organised, or whether it's just part of your day to day practice*" (FY09); lectures and bedside teaching, such as "*Giving lectures to medical students as well as participating in bedside teaching and giving mini-tutorials*" (FY06); and organising a course, "*If I'm attached to a university then to actually take on a teaching course within a medical curriculum, or certainly teaching junior doctors at a postgrad level*" (FY04). One hoped for an academic post, "*Maybe a bit early to be a prof in ten years, but sometime after that hopefully I'd be heavily involved in the academic side with clinical interests*" (FY13).

Learning outcomes in teaching which FY2 doctors think should be core for UK the undergraduate medical curriculum

Overarching LO – medical graduates should be able to teach

When asked directly whether they thought all medical students should learn to teach, fourteen interviewees unequivocally said 'yes', one unequivocally said 'no', and four gave equivocal responses, such as "*I think teaching is very important for doctors… but on the other hand I think there is so much that is already part of the curriculum*" (FY16). Reasons given for students learning to teach were recognition that they had to teach after qualification, "*It's expected of you that you're going to teach, whether you know how to do it or not*" (FY08), and that it would help them consolidate their own learning, "*Having done a little bit of teaching as a medical student myself I*

found it a very helpful way to consolidate my own knowledge" (FY12). Also for personal satisfaction and enjoyment as "*Something else that can just be really good fun, and you can get lots of personal satisfaction from*" (FY16), and as a way of helping more junior students "*Also for the younger students as well… as a third year you can help the first years with stuff… and as a fifth year you can help the third years*" (FY13).

The most common reason given for students not learning to teach were time and curriculum overload, "*I think it's just such a struggle to squeeze more in*" (FY15), and prioritising other content, "*But again that would be a lot of time in the curriculum, if you have time for everybody to practise teaching sufficiently, it would be a lot of time*" (FY15). One actually suggested moving learning to teach into the Foundation programme instead, "*In addition to everything else that they have to do, maybe not… maybe it would be better putting it in Foundation I would say*" (FY14). Some also felt that medical students were insufficiently knowledgeable to teach, "*I think when you're a medical student your major concern is learning, and I think maybe it's better to learn to teach once you've acquired that knowledge*" (FY14). One went further in saying "*If I'm going to teach something I want to know 100% what I'm talking about, and as a medical student I don't think I would have felt that*" (FY19).

Detailed LO related to teaching

When asked what they felt all medical students should learn in relation to teaching, eighteen of the interviewees (all except the one who thought medical students should not learn to teach) suggested multiple potential topics, competencies and learning outcomes at various levels of detail. Often these suggestions were qualified with words such as 'basic', "*I think people should be taught about very basic teaching methods*" (FY01), or 'just' "*Just simply giving a presentation... and understanding a wee bit about how people learn*" (FY03).

Appreciate that teaching will be part of their role

Frequently highlighted was the need for students to learn that teaching will be part of their role after graduation, "*Just saying you know it is part of, it's even in the GMC guidelines that that's part of, your role… everyone will in some way or another be teaching*" (FY09).

Understand when to use different teaching approaches

Interviewees highlighted that medical students should learn about different types of teaching, "*Different types of teaching that you can have*" (FY10), and have an understanding of when to use these different approaches, "*Methods of teaching and what's effective, doesn't work, or different situations in which things might or might not work*" (FY05).

Plan and prepare for teaching

Many interviewees highlighted that medical students should learn how to plan and prepare for teaching, "*Teaching them how to prepare properly, like doing planning for it*" (FY15). This included thinking about environment and context, "*About setting up the environment*" (FY17), and tailoring teaching to their learners, "*Making sure you prepare well, knowing the audience's expectations, knowing to check understanding, and just basic stuff I think would be good*" (FY18).

Deliver bedside teaching
The most common type of teaching interviewees thought medical students should learn to deliver was bedside teaching, "*Basic bedside teaching… somebody standing over them watching them examine a patient or take a history*" (FY13). Typically with real patients, "*Relating it back to actual real life scenarios; so either teaching on the ward and showing someone with heart failure saying 'these are the signs, this is what you might find', rather than standing in front of a board and saying 'look for peripheral oedema and third heartbeat' and things like that*" (FY19). This was recognised as a common type of teaching undertaken by graduates, "*Ways to deliver small group and bedside teaching because that's a lot of what you do*" (FY01).

Deliver small group tutorials
The second most commonly mentioned type of teaching that they thought medical students should learn was how to run a small group tutorial, "*How to run tutorials*" (FY11). This included some of the more specific skills required to manage the group, "*I think like group interaction is the main thing actually, like learning to encourage everyone to contribute and not be intimidated, but at the same time kind of test their knowledge*" (FY08), and particular formats such as scenario-led teaching, "*My own feeling is that scenario-led material is the best small group teaching, where you go through a case and look at learning points*" (FY17).

Deliver presentations to a large group
Some interviewees said students should learn to deliver large group presentations, "*I think probably presentation skills*" (FY16). One broke this down into several more detailed learning outcomes, "*I think that students should be able to give a lecture to be honest. Or not necessarily a lecture, but how to give more of a presentation style thing which is less reliant on interactivity… I think that equipping them with skills to lecture or present would be very useful; and how to create a PowerPoint, and how to minimise the amount of text on it; make it open; opening gambits and ways to lead people into the material; and then complete and summarise*" (FY17).

Teach individuals
One interviewee said that medical students should learn to teach individuals on a one-to-one basis, "*One-on-one tutorial style*" (FY17). Although this was not spontaneously mentioned by any of the other interviewees, many did mention that new graduates need to be able to teach and relate to individual students and other trainees in response to other interview questions.

Teach prescribing and practical procedures
One interviewee specifically mentioned the importance of medical students learning to teach practical procedures and prescribing, "*Fourth years could start teaching practical procedures to third years so they start early. And then the fifth years could start teaching, you know, basic pharmacology and prescribing to fourth years*" (FY06). Another reinforced the need for new graduates to be able to prescribe properly and also be able to teach prescribing to students, explaining, "*I think prescribing is another when you're sort of landed in FY1 and you're expected to be able to prescribe things on day one, it can be a bit daunting*" (FY13).

Apply educational theory
Opinions on how much educational theory medical students should learn, and particularly the balance of theory and practice, were mixed. Some said educational theory was not so important, "*I'm not sure there's any need for lots of academic theory about education, but certainly practical lessons on how to effectively deliver teaching material would be useful*" (FY04). One (FY17) felt medical students should learn some theory, particularly learning styles, whereas others described the need for students to learn some theory but in a very practical applied way, "*The point is that you've got people who learn in different ways and if they're not understanding a concept in a way that you're explaining it then perhaps you should use a different method. I suppose that is important*" (FY15).

Tailor their teaching to different groups of learners
Many interviewees highlighted the importance of medical students learning how to tailor their teaching to different individuals or groups of learners, "*Be able to explain things in different ways*" (FY11). This included for example medical students who have studied at different universities, "*Coming up here has made me realise that people have a very different approach to things, surprisingly different approach to things, compared to where I trained*" (FY17), and being able to pitch their teaching at a level appropriate to different groups, "*Knowing what level to pitch that at… is this going to be way too hard for them, is this going to be way too easy for them*" (FY03).

Make their teaching interactive
A few also suggested that medical students learn how to make their teaching interactive, "*Learning how to encourage the audience to interact*" (FY15), either generally or by using specific techniques and approaches, "*Different techniques… things like buzz groups and line-ups… rather than just using slides and speaking to people*" (FY15).

Provide constructive academic feedback
Many highlighted the importance of medical students learning to give appropriate and constructive academic feedback, "*Learn to give constructive feedback*" (FY11), with one highlighting the importance of feedback being a balance between encouraging and providing useful suggestions for change, "*How to give positive but constructive feedback*" (FY17). One interviewee emphasised this by saying how helpful they had found it to learn to give feedback themselves, "*I think probably some more guidance on actually offering constructive feedback would be very useful as well. I think the first time I'd properly thought about that, again, was recently like a fortnight ago at the tutor-training day. And that certainly made me think about the way that I give feedback to people*" (FY16).

Learn and improve their teaching
One interviewee mentioned the importance of medical students learning how to improve their teaching, "*How to improve their teaching*" (FY01), but did not elaborate further.

Summary of LO suggested spontaneously by FY2 doctors
Most of the interviewees thought that medical students should learn about teaching, although there was considerable variation with regard to what specifically they thought medical students should learn in relation to teaching. Most commonly, interviewees thought medical students should learn to deliver bedside teaching, small group teaching and how to provide constructive academic feedback. They also suggested that medical students should appreciate that teaching is part of their role as a junior doctor, that good teaching requires planning and preparation, that there are different ways of teaching and learning which may be more or less effective in helping individual students to engage with and learn the material.

FY2 interviewee opinions on detailed LO from the Delphi

There was considerable variation between individual FY2 opinions on many of the LO derived from the Delphi study, but overall the majority indicated that they thought 135 of the 153 learning outcomes should be core learning outcomes for the UK undergraduate medical curriculum. Of those, the majority thought they had learned 51 of them during their own undergraduate medical education. Compiled FY2 questionnaire responses to the Delphi learning outcomes are presented in full in Appendix 6a. Only one new learning outcome was suggested in response to the questionnaire by one interviewee, and this was to '*Teach using e-mail and internet forums*'. The explained, "*I think it's quite good to be able to communicate or teach via a video or a telephone conference. I'd probably add through e-mail and through internet forums*" (FY01). There were no suggestions as to how best to group the LO, although one interviewee did comment that the current grouping seemed appropriate, "*I agree with the sub divisions*" (FY01).

When responding to the list of LO derived from the Delphi study, many of the FY2 interviewees asked for clarification regarding the meaning of certain LO, such as "*I don't know what that means, 'constructivist'?*" (FY14), "*'Teach at a distance', what does that mean?*" (FY08), "*What's 'instructional design'?*" (FY02), and "*I'm not sure what 'engage with the scholarship of teaching' means*" (FY01). Most interviewees seemed to find it challenging to indicate what they thought about each of the LO, "*I'm finding this quite difficult actually*" (FY02). Although some seemed to have little difficulty, "*I think for me there was an obvious split between what I think should be core, and what every doctor probably needs to know how to do, and ones that seemed obviously more specialist and only necessary for those wanting to become more involved actively in medical education… I hesitated over a few, but yes – most of them I thought were fairly clear cut in my mind*" (FY12). One interviewee highlighted the difficulty in remembering back to what they would have wanted to know and be able to do a year previously, "*It's hard trying to separate what you have learned and experienced in Foundation from your medical school experience. So I'm not quite sure if I'm answering this on the basis of how I feel now or how I would have felt then*" (FY05). Some expressed difficulty deciding whether or not they had learned the outcomes themselves as an undergraduate, and whether to indicate 'learned' if they had not been formally taught it. One reflected, "*Just being confused about whether things were taught, whether I learned them… whether I learned it enough… how I learnt it*" (FY02), and another, "*If it's things that I think I've learned but I'm not sure… whether it was actually taught to me formally*" (FY02). "*Basically from having it being modelled. You know, we've managed to learn it but it*

wasn't formally taught" (FY02). Another expanded on this in saying "*You certainly learn from watching others teach you at the bedside, but as to how much you have gained from it as to how to do it yourself I'm not quite sure. I guess it's learned to a certain degree but not necessarily practised*" (FY05). This was particularly the case with LO which were primarily learned for another reason and not labelled as 'teaching', "*I guess it made me think maybe I've been taught more about teaching than I thought I had been taught… Even if it's not formally labelled as 'we're going to teach you about teaching', it's in there*" (FY19). One example was communication skills, "*We learnt a lot about communication, but it wasn't in the teaching context*" (FY11). Many interviewees gave other examples of content which they have learned which is relevant to learning to teach, either explicitly labelled as 'teaching' or not. One said they thought such content should be highlighted, "*It's not always obvious that you're being taught to teach or being taught to appraise, and maybe that should have been made clearer at the time*" (FY09). Others offered suggestions and teaching, learning and even assessment methods for some of the Learning Outcomes. Many of which they thought would be relatively straightforward to implement, as one reflected, "*I think actually probably a lot of that is very important. I don't think it would take very much, actually, to teach some of those things*" (FY16).

Many reflected on the large number of learning outcomes, "*I think it's a good list. But I think it's quite too extensive, and I guess I don't think you would ever be able to get all these qualities into the curriculum*" (FY11). In particular they seemed to be concerned about the practicalities of adding them to the undergraduate medical curriculum, "*I think it's overly ambitious to include them all*" (FY01). One interviewee saw them as learning outcomes which they can start to learn as medical students and then build upon over the rest of their career, "*Well it's very extensive. And I think it's a sort of checklist that you need to bring with you, you know, up to even at consultant level and beyond. It's not something that you'd be expected to know fully as a medical student or even a junior doctor*" (FY06). This was supported by another who reflected on how they would have responded had they been LO for the two-year Foundation programme, "*If you'd have asked me to do the same questions but with regard to Foundation, I think I would've put a lot more as core*" (FY14). Others said they thought the list of LO were appropriate and indicated most of them as being 'core' for the undergraduate medical curriculum, "*I think it's a reasonable list. I think some of them obviously overlap with each other*" (FY17). One reflected on how responding to the list of LO was useful in clarifying their own thinking about what 'learning to teach' as part of the undergraduate medical curriculum meant to them, "*I think that's a breadth of things that I wouldn't even have considered, and I suppose I think that I am someone who's quite interested in teaching and medical education. But there's an awful lot there that I wouldn't have thought of myself at all. I'd say I've ticked the 'core but not learned' for the vast majority*" (FY16). Another talked about how it has helped them reflect on their own teaching and what they do to improve it, "*It's certainly made me more aware… and I think it's probably inspired me to be more motivated in my own appraisal of my teaching and to improve that*" (FY05).

FY2 descriptions of teaching they undertook in FY1

General comments

Most of the FY2s interviewed had undertaken teaching in FY1

All but two of the FY2 doctors interviewed described at least one type of teaching they had delivered during their FY1 year. They predominantly reported teaching medical students, although some also gave examples of teaching peers, more senior colleagues, nurses and nursing students. The frequency, duration and types of teaching they had delivered seemed to depend upon a number of factors, including the presence of students, whether students were perceived to want teaching, the post undertaken, other demands on the FY1s' time, and the motivation and enthusiasm of individual FY1s for teaching. One interviewee mused, "*There are definitely some people who jump on every single opportunity… with lots and lots of teaching experience. Likewise there's people who don't seem to do anything at all… I suppose they're either the people who are trying to get through foundation year with the minimum amount of effort and just drifting through it or they've not really thought about it very much*" (FY03). Some interviewees described actively seeking opportunities to teach, "*I've gone out of my way to find teaching experiences, and I don't think people that haven't had the same strong inclination to teach would have discovered such opportunities*" (FY01). Others said they were less active in seeking opportunities, "*I wasn't actively looking out for it, but it depends how busy you are and it's nice if you have time to sort of spend it with the students and teach them properly. You don't always. I am sure there are some people who sort of brush them aside*" (FY08). Two did not seem to have thought much about teaching in FY1, "*In FY1 I don't think I did any teaching at all. There might have occasionally been a few medical students that were attached to us, but for some reason that…I don't remember there being much teaching at all*" (FY10). Interestingly many of the interviewees found it difficult to gauge how their teaching experiences would compare to others, "*I haven't reflected with other FY1 doctors on what their teaching experience is so I'm not sure*" (FY12), as it was not something they had discussed before, "*People don't tend to speak about it*" (FY11).

Time pressures in FY1 constrained the amount of teaching they did

All interviewees mentioned time pressures in FY1, and all those who had taught reported that this seemed to constrain the amount of teaching they had undertaken. "*So in terms of teaching, it was obviously very dependable on how much time you had*" (FY07). Some seemed to think that good teaching had to take a minimum amount of time, "*It can be very busy… students take time, and that's understandable… I don't always have a half hour or 45 minutes to sit with a patient and the student*" (FY11). Others tried to squeeze brief teaching episodes between their other commitments, "*Often in the hospitals I worked in they're so busy it would be very difficult to…I mean you'd try and sneak bits of informal teaching in, but you wouldn't have a massive amount of time for it*" (FY15). Job pressures were also perceived to have an impact on the quality of those teaching episodes, "*And that's been of variable quality depending on how harassed or stressed I've been*" (FY17), and led to interruptions to the teaching "*You have all the time constraints of trying to run the ward et cetera as well, so you're quite often interrupted and yeah, it doesn't really make for an ideal teaching environment*" (FY08). Another reflected on the stress of the FY1 job, saying "*It is more trying to survive on the ward whilst imparting some knowledge to whoever you can*" (FY19). Patient care was generally

seen as something separate and of higher priority than teaching, "*I do all the clinical stuff first, and then I've got time to do the teaching*" (FY10). As a result many said that teaching in FY1 encroached upon, or took place entirely, in their own time, "*It might mean that it takes up a bit of my time and I have to stay back late*" (FY19). One interviewee went further in saying, "*The teaching I do… is almost all in my free time, because the NHS environment doesn't afford time to teach people on the job... Students generally stress me out rather than help me unfortunately, because they generally get in the way. So I teach them in addition. I teach them when I'm free from clinical responsibilities, because I am less caught up in the drama of getting people through or assessing them. Which I think is very sad*" (FY17). They also later said "*Unless someone actually pays junior doctors or… time is protected from clinical duties*…[there is] *probably a ceiling to be reached with voluntary contributions to teaching*" (FY17). Others recognised reported having found quieter times to teach, "*Where you have a quiet afternoon, quite rare usually, but if you did have some time on your hands it's quite nice when you have students attached to the ward to be able to have the chance to say 'is there anything you're particularly interested in learning about*?" (FY05). Some also mentioned quieter jobs in which it was easier to find time for teaching "*Psychiatry is much easier to teach on the job because the pace is slow. So I did teach medical students as I went along more generally*" (FY17).

Teaching students or trainees is different to 'teaching' patients

Many of the interviewees mentioned the similarities and differences between 'teaching' patients (generally referred-to as 'patient education') and teaching students and trainees. As one interviewee explained, "*They are very different obviously, and your aim is very different obviously. With students it's to increase their knowledge for their own practice, and skills for their own practice; whereas patients – I suppose it's still increasing their knowledge and skills, but it's more to deal with their own health rather than necessarily affecting the job that they do. And obviously… you'd have to pitch the teaching differently to a medical student or another doctor than you would to a patient; and I think there's not a huge amount of circumstances when you're teaching patients where it would be a tutorial or a lecture setting… mainly it would be one to one*" (FY15).

Distinguishing between 'formal' and 'informal' teaching

Many interviewees distinguished between 'informal' teaching, undertaken along with day-to-day clinical practice, and more 'formal' organised and pre-arranged teaching. One interviewee explained, "*I didn't do any jobs where I had to do any formal teaching of students, but I did have some kind of students attached to me sometimes on night shifts. So I suppose again quite informal teaching, on the hoof", then later*, "*The prescribing thing for fifth years, and that was much more formal tutorial based*" (FY07). This was echoed by another who said, "*The prescribing tutorials for third years. Giving small group tutorials. That's the main teaching that I've done formally. I suppose kind of day to day when there's medical students around I probably do a bit of informal teaching*" (FY15). 'Bedside teaching' was considered by many to be informal, one for example said "*I did quite a lot of informal bedside teaching*" (FY16), and another, "*I have to say most of it would simply be the bedside teaching that you do and nothing formal, nothing organised*" (FY03). Presentations tended to be viewed as formal, "*Not like in a presentation or anything as formal as that*" (FY08). Sometimes informal teaching was qualified in a way that suggested it

was not regarded as being as important as formal teaching, "*Just off-the-cuff kind of informal type ward based teaching*" (FY13), even when interviewees had taught students in such a way over a week or more, "*Not any kind of formal teaching, but by attaching two students to me for the whole week I've kind of got to do some teaching at some point*" (FY10). One interviewee said they did not think they were 'good enough' to deliver formal teaching, "*I haven't been asked to teach formally, and I don't think I'm good enough to do that… it seems much more informal what the junior doctors are doing*" (FY05).

Types of teaching undertaken by FY2s in FY1

Types of teaching identified in the interviews were initially grouped into 'formal' and 'informal' according to interviewee descriptions, with most of the teaching they had undertaken falling into the 'Informal' group. On further analysis, the informal teaching could be further divided into the mutually exclusive categories of informal opportunistic teaching and (semi-formal) pre-arranged teaching. The remaining types of teaching described by interviewees were therefore arranged thematically into these three broad categories, and are summarised in Box 4.2. Detailed analysis and illustrative quotations for each type of teaching can be found in Appendix 6b.

1. **Informal opportunistic teaching**

    a. Involving medical students in day to day practice
        i. *Encouraging students to follow and observe practice*
        ii. *Providing a commentary and explanation of practice*
        iii. *Responding to student questions*
        iv. *Supporting students in difficult or stressful situations*
        v. *Delegating tasks or responsibilities to students*

    b. Getting medical students to see patients on their own
        i. *Finding patients for students to see*
        ii. *Getting students to 'clerk' and present patients*

    c. Observing or testing medical students and giving feedback
        i. *'Bedside teaching'*
        ii. *Supervising students doing clinical procedures*
        iii. *Testing knowledge and clinical reasoning*

    d. Giving medical students opportunistic 'mini tutorials'

    e. Teaching doctors at the same or higher level

    f. Teaching nurses and nursing students

2. **Semi-formal pre-arranged teaching**

    a. Having students attached to them on 'shadowing' placements

    b. Pre-arranged topic or case based tutorials

    c. Hosting school pupils for work experience

    d. Teaching for societies and friends outside work

3. **Formal organised teaching**

    a. Teaching as part of the 'Foundation Doctor Teaching Scheme'

    b. Covering timetabled tutorials if seniors unavailable

    c. Formal timetabled teaching of clinical procedures

    d. Giving presentations

    e. Organising teaching

    f. Identifying or creating learning resources

Box 4.2 – Summary of teaching undertaken in FY1 by the FY2 interviewees

Perspective on undergraduate LO from teaching undertaken in FY1

If the purpose of learning to teach as part of the undergraduate medical curriculum is to prepare graduates for any teaching they may undertake as an FY1 doctor, the types of teaching listed in Box 4.2 could all be reworded as undergraduate learning outcomes. Item 1a, for example, could become the learning outcome *'Graduates must be able to involve medical students in day to day practice'*. Alternatively, a judgement could be made as to which types of teaching medical graduates are most likely to undertake without further training, and these could be worded as learning outcomes. Most interviewees reported undertaking the first three types of informal opportunistic teaching for example (Box 4.2, items 1a-1c), and so it might seem appropriate for these to become learning outcomes for the undergraduate medical curriculum. Few interviewees were involved in hosting school pupils for work experience, organising teaching or creating learning resources (Box 4.2, items 2c, 3e and 3f) however, and those involved in the 'South East Scotland Foundation Doctor Teaching Scheme' or formal clinical procedure teaching (items 3a and 3c) received further training, so these types of teaching would be of lower priority for medical students to learn. Judging whether some types of teaching, such as being able to cover timetabled tutorials if seniors are unavailable (item 3b), should be learned in the undergraduate medical curriculum or not is more difficult, and is a fertile area for further research and debate.

FY2 comments on the research

When asked if they had any comments on the research or the way it was being done, many FY2 interviewees asked questions about what other data were being collected, how it would be analysed, and anticipated outcomes of the research. One said, "*I think it's interesting. It's a bit different. I've not done this before. I'd be interested to see the outcome of this and see where this is actually going*" (FY03). Others talked more about their own experiences of teaching, the constraints on Foundation doctor teaching, and how certain learning outcomes might be achieved as part of the undergraduate medical curriculum.

III) Focus groups with current medical students

Twelve University of Edinburgh medical students participated in one of three focus group interviews lasting between ninety minutes and two hours. There were many volunteers for Focus Groups A (those who had organised PAL the previous year) and B (those who had tutored PAL), but only three for Focus Group C (those who had not been involved with PAL) - possibly reflecting the different levels of engagement and interest in PAL between these groups. One Focus Group A participant cancelled at very short notice due to illness, therefore there were four participants in Focus Group A, five in Focus Group B and three in Focus Group C.

Medical student demographics

Of the twelve Year 5 students who participated in the focus group interviews, seven were female and five male. All three focus groups were mixed gender (Focus Groups A and B had two males, C had only one). Participants aged between 22 and 25 years (median age 23 years). None were graduate entrants, although two had transferred into the third year of the programme, one from Oxford and another from Malaysia. Three had undertaken an intercalated degree, and one had spent an extra two years in the programme due to illness. It became apparent during Focus Group C that one participant had actually tutored a PAL session, but otherwise the three focus groups reflected different participant involvement in PAL in the preceding year as intended.

Medical student conceptions of teaching

Each of the three groups had animated and wide-ranging discussions in response to the question '*What does the term 'teaching' mean to you?*'. The three data sets were combined prior to analysis, and the results are presented with illustrative quotes in Table 4.4. No attempt was made to analyse each focus group separately, and quotes were selected on the basis of most appropriately representing the theme in the combined data set rather than relative prominence between the groups.

Theme	Sub-themes	Example quotes
Imparting knowledge	Giving facts and information. Transferring knowledge. Passing on information.	"*I guess it's imparting knowledge*" (Y5A4). "*I think the basics of it is just imparting things*" (Y5B1). "*Conveying or transferring knowledge from yourself to somebody else*" (Y5C2). "*Sometimes… you just want the knowledge. Sometimes you do just want the direct answer*" (Y5A2).
Helping learners understand	Explaining things. Using language learner will understand. Pitching at correct level. Making knowledge accessible & digestible. Telling them what you're thinking.	"*Helping others to understand information or how to go about completing a task*" (Y5A2). "*Facilitating your learning*" (Y5B4). "*Explain… in language that the other person will understand*" (Y5C2).
Helping others identify and learn what is important	Giving a feeling for what's important. Sifting through everything. Teaching to the aims or learning outcomes. Going beyond the learning outcomes. Teaching things you can't get in a book.	"*Sometimes reading text books you don't get a feeling of what's actually common, what's actually important, and when someone's teaching you they can sort of sift through everything and then give you what they think is the most important and most sort of useful to you*" (Y5C3). "*Teaching goes beyond what you'll learn in your learning outcomes. Maybe even beyond that… knowledge you'll never get from a book*" (Y5A3).
Role modelling and demonstration	Showing how to do procedures. Role modelling. Showing how to interact with patients.	"*Having somebody to look up to in a way*" (Y5A2). "*Showing someone the way… how you interact with patients… if you have a really difficult patient, how can you approach it*" (Y5A3).
Encouraging and inspiring the learner	Making a connection with the learner. Help them be confident in what they already know. Making learners feel capable. Inspiring learners.	"*You have to teach them to learn to be confident of what they know and build upon that*" (Y5A1). "*Somebody that's sort of inspiring as well… like you're getting encouragement. It makes you feel like you're capable of doing things*" (Y5B1). "*The teacher can make a connection with you*" (Y5B3).

Theme	Sub-themes	Example quotes
Assessing what the learner already knows and giving helpful feedback	Asking questions. Gauging what they already know. Challenging learners. Giving constructive feedback.	"*It's also important to bring out in that person what they already know*" (Y5A1). "*Trying to make them get the most out of it without you almost giving them the answer*" (Y5A3). "*I don't often find it useful when the person just gives you the answer either. There's got to be a degree to which you're challenged, but not made to feel intimidated by not knowing*" (Y5B3).
Help others learn skills	Imparting skills. Transferring skills. Supervising practical skills.	"*Under supervision from people of just sort of how to do the practical things*" (Y5A4). "*Imparting* (Y5B4)… *skills* (Y5B3)". "*The transfer of… skills*" (Y5C1).
Learning by teaching	Reinforcing your own learning by teaching.	"*Teaching others teaches yourself… like reinforces it*" (Y5A3). "*The effect you have from it being reinforced from you teaching it*" (Y5A4).
Avoid impeding student learning	Avoiding / preventing the humiliation of students.	"*Certain people will just teach by humiliation, not many, but some do, which I don't class as teaching… highlighting just how little you know and how worthless your contribution is, I mean that has as many negatives as it has positives*" (Y5B3).

Table 4.4 – Thematic analysis of medical student conceptions of teaching.

Extent to which medical students view teaching as part of their developing professional identity as a doctor

Do medical students currently see themselves as teachers?

When asked directly if they currently saw themselves as a teacher, eleven focus group participants indicated that they did, and one that they did not. In each of three focus groups one participant answered the question by saying 'yes', and then others joined in affirmation explaining why they saw themselves as teachers. Many of them qualified their responses in some way, "*As long as you can be a teacher while still being taught then I think… very small-time teachers, but teachers nonetheless*"

(Y5A4). Some highlighted that they perceived a difference between someone who teaches and being a 'teacher', as the following dialogue from Focus Group B illustrates:

Interviewer:	*Do you see yourselves as teachers at the moment?*
Y5B4:	*Yes*
Y5B5:	*Not professional teachers, but I think anyone can be a teacher… we all probably do teach, but whether you're a teacher I suppose is a semantic point. I don't know, does anyone know what I mean, or…?*
Y5B4:	*Do you mean… if you have a teaching qualification or whether you impart knowledge to other people?*
Y5B5:	*Well yes. Not necessarily have the qualification, but where teaching's part of your job… As medical students, teaching's not really considered a responsibility or part of our role.*
Y5B1:	*Well I guess we do PALs and stuff. We don't have to do them, but it's good experience because in the future it's going to be part of our role.*
Y5B4:	*You always teach with friends as well. I mean like if you're discussing things or studying together… if you know something you can teach them it, and if they know something they can help you. So I guess it's something you just don't think about but you probably are doing all the time"*

Only one of the twelve students said they did not see themselves as a teacher and would not do so until they were at least at consultant level, "*I teach, but I'm not necessarily a teacher. I don't know, maybe it's because I see it like you need an official title… And I'm still not confident enough to label myself as a teacher*" (Y5A3). This Focus Group A participant had been responsible for organising and tutoring a PAL project and had been involved in various other teaching activities. They had, therefore, undertaken considerably more teaching than many of the other medical students who said they did see themselves as teachers.

Factors contributing to students seeing themselves as teachers

When asked when they first saw themselves as a teacher, some said it was when they undertook PAL teaching, "*I think the whole time we are teaching people, but we never formally admit… I think more recently when you actually enter a more formal programme like a PAL session where you're a teacher and you're teaching a peer. Then I realise 'Oh, actually I'm a teacher now'*" (Y5A1). Some said they had only recently started to feel like a teacher when with more junior students, "*I didn't until just the rotation there, I definitely wouldn't have felt myself qualified enough to be a teacher as it were. But I mean even the simple things, like I was able to show them how to put in a cannula*" (Y5C2). They also reflected on their increasing knowledge and expertise, "*It was strange, that was the first sort-of time I'd had somebody younger than me and less experienced than me come and ask me a question and know the answer… I know so much more, and it's there without having to think about it and go over and study at it all the time*" (Y5C2). Others said they first saw

themselves as teachers outside of medical education at school, "*I think at school… I volunteered to teach the first and second year maths classes*" (Y5C1), or in other activities, "*I've been a scout leader for a while, so obviously I feel like a teacher in that context*" (Y5B5). Focus Groups A and B also discussed feeling like a teacher with regard to patient education, "*I suppose you sometimes…it's not teaching, but it's explaining things to patients. Sometimes if they as you a question about how something works in the body*" (Y5A2). Both groups clearly distinguished this from teaching students and colleagues however, "*Sometimes you're educating patients, although I guess it's not necessarily the same thing… it's a bit arbitrary to just go 'this is a teacher and this is an educator', but I mean you're always, or at least often, giving patients' advice or reassuring them, telling them about things and educating them… So it's not just teach somebody who's learning to be a doctor as well, teach them medical information and things*" (Y5B4).

Would students like to be involved in teaching in 10 years?

When asked what sort of doctor they would like to be in ten years, all participants started by describing their preferred clinical speciality. One of the participants in Focus Group A mentioned teaching and a group discussion ensued regarding the type of teaching they would like to be involved in. Teaching was also mentioned spontaneously by a participant in Focus Group B but there was no further spontaneous discussion of this, nor any in Focus Group C. When prompted on this topic, all twelve participants said that they would like to be involved in teaching in ten years. All three groups seemed to expect teaching to be part of their role as a doctor, "*I think we just take it for granted that there'll be teaching involved because we're all going to have juniors, whether it's medical students or people below you*" (Y5B1). Generally they seemed positive about this, "*I'm quite looking forward to having medical students when I'm an FY1 and doing teaching. Because it's nice when you get a really good FY1 that helps you and shows you the ropes and goes over things and helps you learn*" (Y5B4). Another reflected, "*I'd definitely want to be one of those people that students can approach and get information from, because there's no point teaching if your students are afraid of you*" (Y5C1). One even reflected on how many more people they could influence by teaching than by seeing patients, "*It's the fact that you can treat a patient and help one person, but if you teach somebody you exponentially grow the sort-of end effect of people that eventually sort-of benefit from your knowledge*" (Y5C1). Participants seemed to think it would be easier for them to become involved in certain types of teaching than others however, "*I've never really understood how you get the opportunities to do certain sorts of teaching, because I think some of them just happen. If you become an FY1 then you will have people on the ward and then it's up to you to find the opportunity to teach them. But… if you were to want to get into doing lectures… it does feel a bit of a mystery as to how to get there*" (Y5B3).

Learning outcomes in teaching which students think should be core for the UK undergraduate medical curriculum

Overarching LO – medical graduates should be able to teach

When asked directly whether they thought all medical students should learn to teach, all three participants in Focus Group C (not involved in PAL) unequivocally said 'yes'. Four of the five participants in Focus Group B (PAL tutors) unequivocally said 'yes' and one gave an equivocal response. Three of the four participants in Focus Group A (PAL organisers) unequivocally said 'no', and one gave an equivocal response, saying "*You get good at teaching by kind of practising it… maybe the question should be 'should medical students practise to teach?' instead*" (Y5A4). Participant opinions on whether medical students should all learn about teaching as part of the undergraduate medical curriculum in this small sample, therefore, seemed to be inversely related to the amount of experience they themselves had of teaching as part of the undergraduate medical curriculum.

Reasons given by participants in Focus Group A for students not learning to teach included arguments that it was unnecessary, "*To formally teach someone to teach is probably not necessary*" (Y5A1), and against forcing people to teach who were not interested, "*It shouldn't be forced upon you… consultants who are not good at teaching are the ones who don't want to teach*" (Y5A3). They seemed particularly concerned about the impact such individuals may have on their learners, "*With teaching you don't just affect yourself, you affect the people you're teaching as well. So if you don't have a passion for teaching and you're going to force someone to learn to teach… the people who are learning from them won't learn very well*" (Y5A1). Similar concerns were raised by the other two groups. For example, one participant in Focus Group B said, "*I certainly think people should learn, should be given some kind of introduction to it, although… I don't think people should then be forced to teach*" (Y5B3). They then elaborated, "*The worst aspects of medical school have all been people who don't have any passion for teaching but it's part of their job description… those are the people who don't turn up to sessions. Those are the people who will give you a very generic grade and almost no feedback*" (Y5B3). Whilst agreeing with this, one of the others replied saying that they still thought all medical students should learn something about teaching, and "*Force everyone to at least do the minimal amount of teaching… I think everyone should have at least one experience of a PAL or something like that*" (Y5B5). Another reflected, "*I feel like if it was part of the course it would be just like any other exam or piece of coursework… I still think it would probably be good to have something where people did have to teach*" (Y5B4). Reasons given for students having to learn to teach all related to them having to teach as doctors, "*Because they'll have to do it when they're doctors*" (Y5B1). These expectations included both junior and senior doctors, "*A good bulk of the learning that we do is on the ward from the doctors, whether it be the consultants giving us a tutorial or the junior doctors explaining things as we go around on the ward round*" (Y5C2). Focus Group C expanded on this by discussing their apprehensions in relation to teaching as an FY1 doctor, "*Oh my goodness, what happens in the first week of FY1 if someone comes and asks me a question and I can't answer… I think there's definitely that, 'Am I going to look like an idiot to the students'*" (Y5C2), which they thought could have been alleviated if they had been required to practise as medical students "*Even having an opportunity*

to do it beforehand so there's not that fear factor" (Y5C3). The focus groups did not specifically explore why some students had been much more involved in PAL than others the previous year, although some students did spontaneously say that they had not noticed certain opportunities until it was too late, or had prioritised learning other curricular content which had seemed to be more important.

Detailed LO related to teaching

When asked what they felt all medical students should learn in relation to teaching, participants in Focus Group B and C suggested a number of specific learning outcomes which are presented below. Participants in Focus Group A did not suggest any specific learning outcomes. All three focus groups also highlighted parts of their current undergraduate medical programme in which they have learned skills relevant to teaching such as communication skills, presenting to a group, patient education, and group learning in problem based learning (pbl), "*We do so many communications skills and that kind of stuff which is obviously a basis for teaching, and pbl even in first and second year is a good teaching forum if you're interested enough*" (Y5B4).

Teach with confidence and experience

Many participants in each of the groups highlighted the importance of experience in learning to teach, and of gaining confidence in their abilities in teaching. As one reflected, "*I think teaching is about confidence, and the only way you gain confidence in something is if you've done it before*" (Y5C1). This seemed to be prioritised by many over learning theory, "*Well, they don't really necessarily need to learn too much about teaching theory or anything along those lines, but I think it's more they just get the experience of organising teaching and carrying it out*" (Y5B5).

Understand how different people learn

Some participants did suggest that medical students should learn some educational theory however, such as "*How different people learn*" (Y5B4), or the association between how material is presented and retention, "*Some really basic stuff. For example the literature says only 10% of the lecture gets retained… The more different mediums that are used, so visual, audio and written presentation of information, the more likely the person is to remember it*" (Y5B5).

Teach students about working on a ward

One participant suggested that it was important to learn how to teach medical students effectively in a clinical ward-based environment, suggesting that this was where FY1s would do most of their teaching and was also the best place for medical students to learn certain skills such as, "*How to present stuff… how to be sort-of effective when you're writing in the notes… how to effectively communicate with other people when it's an emergency. Stuff that's not directly taught in a lecture*" (Y5C3).

Understand when to use different teaching methods

Some discussed the need to be aware of different teaching methods and to understand when to use them, "*Different teaching methods… and different ways you can use within teaching to gauge people's attention and get feedback, teach different ideas and understanding the concepts*" (Y5B4). This was not elaborated further.

Lead a small group
The ability to manage small groups was suggested by Focus Group C. This would include learning how to plan and organise a group, "*How to keep a group of people interested over, say, an hour long tutorial. What ways are there to mix it up?*" (Y5C3), and also how to manage common problems, such as "*How to handle certain situations… if there was a group of six people and one person was never answering questions. Like how to get them involved without pressurising them*" (Y5C3).

Communicate with learners
As well as recognising that medical students already learn clinical communication skills, one participant specifically highlighted the importance of medical students learning to communicate with learners, "*They need to be able to communicate effectively, and there's nothing worse than somebody trying to teach you and they're unable to communicate what they're saying. Because you want to learn, they want to teach, but it's not really going anywhere*" (Y5C1).

Student opinions on detailed LO from the Delphi

There was considerable variation between individual student opinions on the LO derived from the Delphi study, but overall the majority indicated that they thought 129 of the 153 learning outcomes should be core learning outcomes for the UK undergraduate medical curriculum. Of those, the majority thought they had learned 85 of them during their own undergraduate medical education to date. Compiled student questionnaire responses to the Delphi learning outcomes are presented in full in Appendix 7a. The compiled responses from each focus group were also compared and found to be remarkably similar, with opinions differing between groups on only a small number of learning outcomes (tabled in Appendix 7b). The students did not suggest any additional learning outcomes in response to the questionnaire.

When responding to the list of LO derived from the Delphi study, many participants asked for clarification regarding the meaning of certain LO, such as "*What's a 'constructivist approach'?*" (Y5A2), "*What's 'on take'?*" (Y5A1), "*What's 'formative assessment'?*" (Y5B1), "*What's 'instructional design'?*" (Y5B4), and "*What's 'the scholarship of teaching'?*" (Y5B1). Some asked for clarification with regard to the task and whether they were being asked to indicate if it they thought each LO should be core or was currently core, "*What you think should be core, not what is currently core?*" (Y5B2), or if they need to have been taught it, "*Can you learn it without having been taught it?*" (Y5B3). Some found it difficult to decide whether they had learned it sufficiently, "*You can't say you've fully learnt it, but you've not like 'not learned' it… You know it's important and you're doing your part, but you don't feel like you're completely ready with it so… it's difficult to say not learned or learned*" (Y5A3). When asked whether they thought they would achieve any more of the LO by the time they graduated (approximately 4-5 months later), a number of participants highlighted that in preparation for finals they would consolidate their knowledge and skills in explaining concepts, "*I'd probably say 'Explain concepts effectively' maybe. Like I think that at the moment my knowledge base isn't at the standard it would need to be*" (Y5B3), and decision-making, "*Decision making as well. We've got another couple of months to perfect our skills on that so that we'd be at the level where we could teach it as well as doing it*"

(Y5B2). One also highlighted that they would practise identifying and addressing learning needs, "*Probably a few of the learner-centeredness things… because I like revising in groups when it comes to the kind of exams that are coming up and finals, and so there will be a lot of identifying needs and negotiating what needs to be taught*" (Y5A4).

All three groups mentioned that there were a very large number of learning outcomes. One said they thought there was some overlap between them, "*A lot of the points are made around the same concept. You could have amalgamated a few of them*" (Y5B4). One reflected that it would be difficult for any one person to achieve all of them at all, "*It's probably difficult to be all of these things in a lifetime. I think it's different people do different things, and then like in a team it all kind-of comes together*" (Y5A3). Some also mentioned that some seemed more advanced than would be required from them following graduation, "*Some of them are things that at the moment we won't need until we're like at consultant level*" (Y5B2). Even then, some considered that the teaching abilities they actually use would depend upon the job they undertook, "*It's interesting thinking about this in theory versus putting it into practice… it would be great to be so involved in teaching… a lot of it will depend on the sort-of nature of the job you're in and how much teaching you can do formally and how much teaching you can give opportunistically*" (Y5A4). However, some participants highlighted that they had achieved many of the outcomes already, although not always explicitly, saying "*I think a lot of it is, even though it's probably not been said, but you sort-of think about it anyway. And you sort-of get exposed to it. Like, for example, like the different styles of teaching*" (Y5C3). Another seemed pleasantly surprised at how much they had already achieved, "*I realised how many of these I thought were core and that I had done or practised… Whereas at the beginning you said 'oh have you done any undergraduate teaching?', and I'm like 'no!'. You know, you forget the opportunities that you actually do as you go through until you've actually got them written down in front of you*" (Y5C2).

Student descriptions of teaching received from FY1 doctors

All focus group participants had received teaching from FY1 doctors. Most of them described being taught in multiple different ways by many different FY1 doctors. Some general emergent themes are presented below, followed by specific examples of teaching they described receiving. These have been analysed and reported according to the framework of FY1 teaching which emerged from the FY2 interviews.

General comments

FY1 teaching is different to teaching from more senior doctors

All student participants reported having received FY1 teaching and that they perceived it to have been helpful to them. Many contrasted it with less useful teaching they had received from faculty, "*Just because you're a teacher doesn't mean you can teach… Sometimes the best teaching you get is from an FY1 or 2*" (Y5A3). FY1 teaching seemed to be particularly appreciated for helping students prepare to work as FY1s themselves, "*You're going to do their job so they're probably the best person to teach you how to do that, rather than a consultant… he's*

not really that much on the front line for fluid prescriptions… like most consultants don't know how to use TRAK [computerised test result system]" (Y5A3). FY1 teaching was, however, considered by one participant to be less useful where more in-depth understanding or knowledge was required, "*Fluid prescribing and practical prescribing on the wards, like the junior doctors are really good for that because it's at their level, it's what they're doing day in day out. Whereas sometimes if you want to go for more in depth learning of pathology and pharmacology… that's better delivered by someone more senior like a registrar or consultant*" (Y5A3). Reasons for the perceived benefits of receiving FY1 teaching included the similarity in stage of training and knowledge of what students needed to learn, "*I also think F1 teaching… tends to be quite good, because they've just been to medical school, they know what you need to learn*" (Y5B5); being able to pitch their teaching at an appropriate level, "*He's just finished his finals and he knows what we need to know for our level, and he can pitch it exactly, like how we need to know it. So not saying that consultants are not very good… they probably have a similar knowledge or even better, but they just don't know how to bring it back down to our level… we grasp things very quickly from them. So I think that's why we generally find that they are very, very good teachers*" (Y5A1); and being able to ask 'stupid' questions without fear of humiliation, "*It's almost easier and more comfortable in that sort of setting to ask stupid questions or make stupid suggestions, and they're not going to turn around and laugh, you know, like a consultant might*" (Y5C2).

FY1 teaching can be variable

Some FY1 teaching was perceived to have been particularly useful in helping participants learn, "*There was an FY1 who was just wonderful… it's just been one of the best teaching experiences I've had*" (Y5B1). The same participant, however, reflected that the amount and quality of teaching received was very dependent on individual FY1s, "*I think it is just very dependent on if there's somebody who's really enthusiastic… essentially you could get none if you worked somewhere where there wasn't somebody keen*" (Y5B1). The other group participants seemed to agree with this statement. Many participants attributed good teaching to personal factors and / or skills of particular FY1 doctors, "*It's nice when you get a really good FY1 that helps you and shows you the ropes and goes over things*" (Y5B4). They suggested one of the reasons some FY1s wanted to teach was because they were interested and enthusiastic about teaching, "*That's purely out of his own 'I'm interested in teaching and I want to tell you something' as opposed to formal he has to do it*" (Y5B4). Some did, however, also say they thought part of the reason FY1s wanted to teach was because they need to demonstrate teaching experience in ST applications, "*On the ST1 applications there's points at the very bottom for informal teaching, organised teaching, and so on*" (Y5B5). Only one participant also reflected that student enthusiasm and engagement could also impact upon FY1 engagement in teaching, "*Like you can choose to sort of get stuck in and help them out, and if you do then you seem to pick up more practical experiences… if you don't put in that effort then they're less inclined to give you teaching and to help you out*" (Y5A4).

Formal, informal and semi-formal teaching

As with the FY2 interviewees, focus group participants distinguished between formal teaching (such as the Foundation Doctor Teaching Scheme prescribing tutorials) and

informal teaching, "*The formalisation of it [teaching] through the prescribing tutorials is good, and I think it will make people a lot more aware of doing it informally*" (Y5A2). One participant also considered pre-arranged tutorials as an intermediate category, which they called a "*Sort of informal-formal teaching*" (Y5C3). This is consistent with the broad categories of Formal, Semi-Formal and Informal teaching which emerged from the FY2 interviews.

Types of teaching received by students from FY1s

The framework of FY1 teaching which emerged from the FY2 interviews (Box 4.2) was used to analyse the types of teaching student participants described receiving from FY1s. Many of the types of teaching which the student participants reported having received from FY1 doctors had also been described by FY2s, although one new type of teaching – '*2.e. Pre-arranged formative assessments (e.g. mock OSCE)*' – was identified and added to the framework. Two other new themes – 'teaching allied health professionals' and 'giving lectures' – were also identified but seemed to overlap with existing types of teaching in the framework (1.f. and 3.d. respectively) and so have been synthesised with these. A number of types of teaching described as having been delivered by FY2 doctors were not described as having been received by students. The findings of the student focus groups are presented together with the findings from the FY2 interviews for comparison in Box 4.3. Detailed analysis and illustrative quotations for each types of teaching the students reported receiving from FY1 doctors can be found in Appendix 7c.

1. **Informal opportunistic teaching**

    a. Involving medical students in day to day practice
        i. *Encouraging students to follow and observe practice*
        ii. *Providing a commentary and explanation of practice*
        iii. *Responding to student questions*
        iv. ***Supporting students in difficult or stressful situations***
        v. *Delegating tasks or responsibilities to students*

    b. Getting medical students to see patients on their own
        i. *Finding patients for students to see*
        ii. *Getting students to 'clerk' and present patients*

    c. Observing or testing medical students and giving feedback
        i. *'Bedside teaching'*
        ii. ***Supervising students doing clinical procedures***
        iii. *Testing knowledge and clinical reasoning*

    d. Giving medical students opportunistic 'mini tutorials'

    e. Teaching doctors at the same or higher level

    f. Teaching nurses, nursing students and allied health professionals

2. **Semi-formal pre-arranged teaching**

    a. Having students attached to them on 'shadowing' placements

    b. Pre-arranged topic or case based tutorials

    c. Hosting school pupils for work experience

    d. Teaching for societies and friends outside work

    e. Pre-arranged formative assessments (e.g. mock OSCE)

3. **Formal organised teaching**

    a. Teaching as part of the 'Foundation Doctor Teaching Scheme'

    b. Covering timetabled tutorials if seniors unavailable

    c. Formal timetabled teaching of clinical procedures

    d. Giving presentations or lectures

    e. Organising teaching

    f. Identifying or creating learning resources

Box 4.3 – Summary of teaching undertaken by FY1 doctors
Those in plain text represent FY1 teaching which both the FY2 doctors reported having delivered the previous year and the medical students reported having received from FY1s. Those in bold text were reported only by FY2s, and in underlined text were reported only by students.

Other comments about the research

When asked if they had any comments on the research or the way it was being done, some participants asked for further information about what other data were being collected and how they would be used. Focus Group A participants reflected on the relative merits of meeting in person rather than for example e-mailing a questionnaire, "*This kind of face to face interaction is better than filling out a questionnaire*" (Y5A3). One participant even said that the focus group had been useful to them in encouraging reflection on teaching and on them learning to teach, "*I think it's taken even just this focus group for it to kind-of get into my head, 'oh well, you will have to be responsible at some point for teaching somebody, think about it now', so that's definitely been a benefit of coming to this!*" (Y5C2).

(this page is intentionally blank)

IV) Addressing the research questions through comparison and synthesis of the three data sets

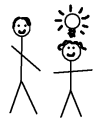
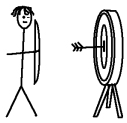
This final section of Results draws on data from all three participant groups, comparing, synthesising, and re-analysing certain findings to demonstrate how they address each of the research questions in turn.

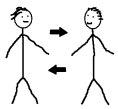
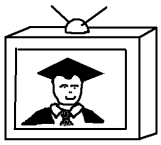
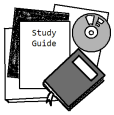
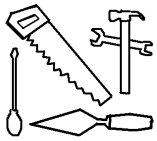
Q1. How do experts in medical education, medical graduates and current students conceptualise teaching?

Each of these three groups gave complex and multi-faceted responses to the question '*What does the term 'teaching' mean to you?*' A number of themes or 'conceptions' emerged from analysis of the data, some of which emerged from two or all three of the groups, although none of them were expressed by all individual participants. In this section these are compared with each other and with conceptions of teaching identified in the literature. This is followed by a simple textual analysis of the three data sets as word clouds.

Q1a. Conceptions of teaching – grounded theory analysis

Conceptions of teaching emerging from the thematic analysis of responses in the expert Delphi (Table 4.1), FY2 interviews (Table 4.3), and student focus groups (Table 4.4) were compared with, and mapped to, each other and with the 24 conceptions of teaching identified in the literature (Chapter 2, Figure 2.17). There was one example in which two conceptions from the expert Delphi mapped to a single conception from the literature ('*Targeting learning needs*'), but otherwise all of the conceptions of teaching from data collection seemed to map in a one-to-one relationship relatively easily with each other and with conceptions of teaching identified in the literature. These findings are presented in Table 4.5.

Expert Delphi	FY2 Interviews	Student focus groups	Conception from literature
Helping others to learn	Helping others to learn	Helping learners understand	 FACILITATING UNDERSTANDING
Helping learners define & address their own learning needs Defining what learners should learn		Helping others identify (and learn) what is important	 TARGETING LEARNING NEEDS

Expert Delphi	FY2 Interviews	Student focus groups	Conception from literature
Helping learners identify and use opportunities to learn			 DIRECTING ACTIVITY
Imparting knowledge and skills	Imparting knowledge and skills	Imparting knowledge	 IMPARTING INFORMATION
Engaging learners	Generating interest and enthusiasm	Encouraging and inspiring the learner	**Not identified in the literature**
Supporting learners	Helping learners gain independence	Help others learn skills	 SUPPORTING GROWTH
'Being with' learners	Engaging learners in dialogue		 ADULT – ADULT INTERACTION
Adapting to learners and context	Packaging information	Helping others (identify and) learn what is important	 TRANSMISSION
Making resources available			 PROVIDING RESOURCES
Selecting and using appropriate teaching methods & approaches	Undertaking a range of different activities		 COMPETENCE
Designing learning events and courses			 DIRECTING ACTIVITY

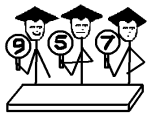
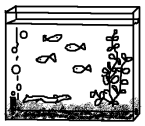
Expert Delphi	FY2 Interviews	Student focus groups	Conception from literature
Assessing learning and giving feedback	Checking understanding	Assessing what the learner already knows and giving helpful feedback	 ASSESSMENT
Maintaining and enhancing standards			 MANAGED PROCESS
Role modelling	Modelling behaviour Sharing experience	Role modelling and demonstration	 APPRENTICESHIP
Learning and developing by teaching		Learning by teaching	 LEARNING ACTIVITY
Changing others			 SUPPORTING TRANSFORMATION
Establishing a learning environment		Avoid impeding student learning	 SYSTEM
Innate human attribute* * responses to "What does 'learning to teach' mean to you?"			 COMMON SENSE
	Sharing experience		 APPRENTICESHIP

Table 4.5 – Comparison of teaching conceptions from the three groups of participants and the literature

Eighteen of the 24 conceptions of teaching identified in the literature emerged from the original data collected in this study. Of these, seventeen emerged from the expert data, nine from the FY2 data, and nine from the student data. One new conception of teaching also emerged from analysis of the data from all three

participant groups which had not been identified in the literature, namely teaching as 'Generating enthusiasm' (Figure 4.1).

Teaching as generating enthusiasm
Teaching is about making a connection with the learner and enthusing them about the content and making it seem interesting, helping them to feel confident in what they already know and can do, and motivating or inspiring them to learn and develop further.

Figure 4.1 – 'Generating enthusiasm' conception of teaching

Twenty-five discrete conceptions of teaching were therefore identified in this research from the literature and data collection. These are outlined later in Table 4.8. These could then be used as a framework to analyse other research findings.

Q1b. Conceptions of teaching – textual analysis

Entering the collected responses from the three groups to the question '*What does the term 'teaching' mean to you?*' into the online tool Wordle™ (Feinberg 2011) resulted in the generation of three very different word clouds (Figures 4.2, 4.3, 4.4).

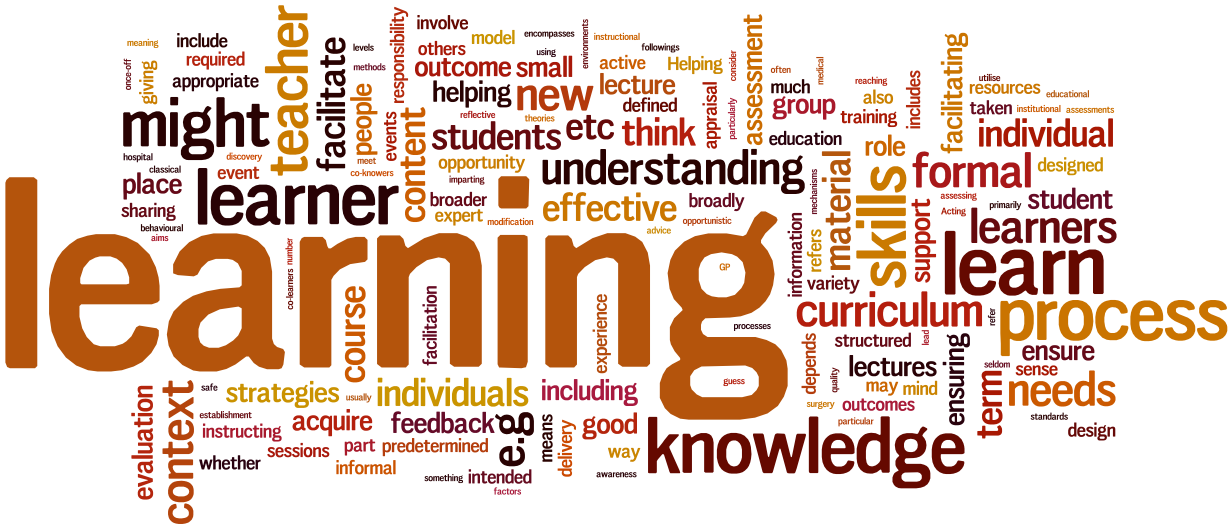


Figure 4.2 – Word cloud of collected responses from Delphi panel of 18 experts in medical education to the question '*What does the term 'teaching' mean to you?*'

Figure 4.3 – Word cloud of collected responses from interviews with 19 FY2 doctors to the question '*What does the term 'teaching' mean to you?*'

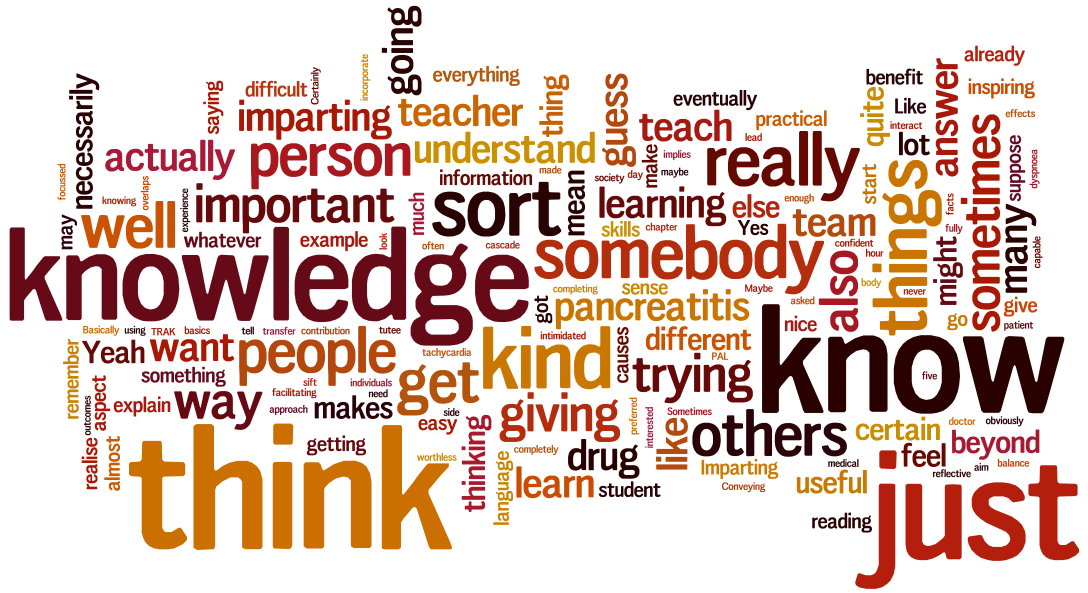


Figure 4.4 – Word cloud of collected responses from focus groups with 12 Y5 medical students to the question '*What does the term 'teaching' mean to you?*'

Although these word clouds represent a very simple textual analysis of the three sets of data based on word frequency, and are not directly comparable due to the different research methods used, they are strikingly different and support the grounded theory findings that there are differences in meaning attributed to teaching by the three groups. The word 'learning' clearly dominates the expert word cloud. Reviewing the original data revealed that almost all of the experts had articulated a conception of teaching which mapped to the '*Facilitating understanding*' conception of teaching

outlined in Table 4.8. Some experts only wrote short well-articulated phrases such as "*Helping others to learn*" (EU03), which raised the possibility of some of these being rehearsed responses to the question. Others wrote up to 250 words of personalised reflection with examples to explain what the term 'teaching' meant to them, often in doing so articulating a number of other conceptions of teaching.

The word 'knowledge' dominates the FY2 word cloud, and on reviewing the original data revealed that most of the FY2s had articulated a conception of teaching which mapped to the '*Imparting information*' conception of teaching outlined in Table 4.8. Again on reviewing the recordings it seemed that some interviewees had very quickly answered the question with short, well-articulated phrases which raised the possibility of some of these being rehearsed responses. Both the '*Facilitating understanding*' and '*Imparting information*' conceptions also emerged from analysis of the responses from the other two groups, as did the words 'learning' and 'knowledge', but less frequently.

The student word cloud is the most difficult of the three to interpret, and includes words which at first glance seem anomalous. The idea that teaching means 'pancreatitis' or 'drug' (both medium-sized and clearly visible in the cloud), for example, does not seem to make sense. Returning to the original data, however, reveals that these words appeared in practical examples which student participants had used to express what they wanted to say. The students also seemed more hesitant and were likely to use academic language than FY2 doctors to express what teaching meant to them – hence the appearance of 'sort' and 'kind' (from 'sort of' and 'kind of', with the common word 'of' removed). Both students and junior doctors were less likely to use academic language than the experts, but it is difficult to draw any conclusions from this as the experts expressed their opinions in writing rather than using spoken language.

One possible interpretation of these findings would be that students do not generally think about teaching and so have some difficulty articulating what it means to them, then as they become junior doctors and novice teachers they develop a teacher-centred perspective focusing on how they can best 'transfer knowledge', and then later with experience they become more student-centred and focus on student learning. This would be roughly consistent with Kugel's (1993) findings that teacher development occurs in stages, with novice teachers focusing on their own role as a teacher, then on the subject matter that they teach, and then with expertise they focus increasingly on student learning and independence. Another possible interpretation, however, would be that the experts were more likely to give what they thought was the 'correct' response to the question, rather than the more spontaneous responses of the other two groups. These would be interesting avenues to explore in future research.

Q2. Do medical graduates and students view teaching as part of their developing professional identity as a doctor?

Eleven of the nineteen FY2 interviewees and eleven of the twelve final year student participants said that they currently saw themselves as teachers. Four of the FY2 doctors and one of the students said they did not currently see themselves as teachers,

and the remaining four FY2 doctors give equivocal responses. Some saw themselves as teachers because they were involved in teaching, although not all shared this view, as one FY2 elaborated, "*I think you are teaching all the time. But if I was asked 'am I a teacher', probably I wouldn't say yes*" (FY18). Some members of both groups articulated that to see themselves as a teacher also requires content expertise and teaching abilities, and may require teaching to be expected of them as part of their job. Some saw FY1 as including an expectation to teach, and therefore considered graduation and beginning work as a junior doctor to be the point of transition where they also become a teacher. This seems to reflect the view of many of the expert Delphi panel, and explicitly stated in some GMC documents, that teaching is part of the role of all doctors. Other FY2s and students, however, saw this expectation to teach, and thus transition to being a teacher, to occur only when they became more senior specialist trainees or consultants. All FY2 and student participants said they expected teaching to be part of their job in ten years time, and it seemed to be generally accepted that all senior doctors will to some extent be involved in teaching.

Q3. What LO in teaching do experts in medical education, recent medical graduates and current students think should be core for the UK undergraduate medical curriculum?

The learning outcomes which each of the three groups spontaneously suggested and those that they rated from the Delphi are compared in this section. The relationship between these perspectives on learning outcomes and individual conceptions of teaching are then explored.

Q3a. How do the perspectives of these three groups compare?

i) Comparison of spontaneous suggestions

Fourteen of the eighteen experts, fourteen of the nineteen FY2 doctors and seven of the twelve medical students stated unequivocally that they thought all medical students should learn to teach as part of the undergraduate medical curriculum. The majority of participants in each group and overall, therefore, considered the learning outcome that medical graduates should be able to teach as core for the UK undergraduate medical curriculum. One expert, one FY2 doctor and three medical students (from a single focus group) stated that they did not think all medical students should learn to teach as part of the undergraduate medical curriculum. The remaining three experts, four FY2 doctors and two medical students gave equivocal responses.

Asking participants what medical students should learn in relation to teaching as part of the undergraduate medical curriculum resulted in spontaneous suggestion of core learning outcomes (LO) from each of the three groups - 144 from the experts, thirteen from the FY2 doctors, and six from the medical students. These are not directly comparable, however, due to the different research methods used, and also the addition of learning outcomes from a paper which one of the Delphi experts asked to be included (Hesketh *et al.* 2001). The spontaneous suggestions for learning outcomes from the three groups were compared and mapped to each other and to the final learning outcomes from the Delphi, and results are presented in Table 4.6. One LO was suggested, by students in Focus Group C, which did not map to an outcome

already suggested in the expert Delphi - '*Teach with confidence and experience*'. Only two LO were spontaneously suggested by all three groups – '*Lead a small group tutorial*', and '*Select appropriate teaching and learning strategies for given learning outcomes*'. There was, therefore, considerable variation and little consensus in the spontaneous suggestions for learning outcomes between the three groups.

LO suggested by FY2 interviewees	LO suggested by medical students	Mapping to related LO from expert Delphi
Appreciate that teaching will be part of their role		3. Recognise and carry out their obligations in relation to teaching and learning
Understand when to use different teaching approaches	Understand when to use different teaching methods	111. Select appropriate teaching and learning strategies for given learning outcomes
Plan and prepare for teaching		45. Plan a teaching session
Deliver bedside teaching		55. Teach at the bedside
Deliver small group tutorials	Lead a small group	60. Lead a small group tutorial
Deliver presentations to a large group		52. Gain audience participation / interaction in a large group presentation
Teach individuals		53. Deliver one-to-one teaching
Teach prescribing and practical procedures		30. Teach practical clinical skills
Apply educational theory		26. Apply their understanding of educational theory and principles
Tailor their teaching to different groups of learners		5. Engage with learners at an appropriate level 18. Adopt a learner-centred approach to teaching
Make their teaching interactive		49. Seek participation from all involved in a teaching session 52. Gain audience participation / interaction in a large group presentation
Provide constructive academic feedback		94. Apply the principles of good feedback 96. Give appropriate academic feedback
Learn and improve their teaching		140. Critically reflect and learn from teaching and learning experiences 144. Engage in continuing professional development as a teacher

LO suggested by FY2 interviewees	LO suggested by medical students	Mapping to related LO from expert Delphi
	Understand how different people learn	23. Apply their understanding of how individuals learn
	Teach with confidence and experience	-
	Teach students about working on a ward	56. Teach on the ward 61. Facilitate experiential and work based learning
	Communicate with learners	2. Communicate effectively in a teaching context 5. Engage with learners at an appropriate level

Table 4.6 – Comparison of LO in teaching suggested spontaneously by FY2 doctors and final year medical students for the UK undergraduate medical curriculum, mapped to detailed LO suggested by the expert Delphi panel (numbered).

ii) Comparison of opinions on list of LO derived from the expert Delphi

The second and third rounds of the expert Delphi resulted in the spontaneous suggestions for learning outcomes developing into a final list of 153 detailed learning outcomes in total, 114 of which the panel thought should be core (mean Likert score greater than 4.5) for the UK undergraduate medical curriculum. When these were subsequently rated by the other two groups, the majority of FY2 doctors thought 135 should be core, and the majority of final year medical students thought 129 should be core. Perspectives on core learning outcomes for the UK undergraduate medical curriculum are compared by respondent group in Table 4.7. For the purposes of comparison, the mean Likert scores from Round 3 of the Delphi have been summarised as learning outcomes the expert panel should be core (mean Likert score greater than 4.5), or not core (mean Likert score less than 3.5), and those on which they were equivocal (mean Likert scores 3.5-4.5). These could then be compared directly with those that the majority of FY2 doctors and medical students thought should be core, not core, and those on which they were equivocal.

There was consensus (the majority of each group responding similarly) between all three groups on 119 of the 153 learning outcomes. All three groups thought that 111 of the Delphi learning outcomes should be core for the UK undergraduate medical curriculum, and eight should not be core. There was consensus between two of the three groups for 32 of the remaining LO (i.e. 'core', 'not core' or 'equivocal'), and no consensus (all three groups responding differently) for two of the 153 Delphi learning outcomes (numbers 66 and 76). There was, in stark contrast to their spontaneous suggestions therefore, a high degree of consensus between the three groups on which of the 153 learning outcomes resulting from the Delphi study should be core.

LO number	Learning Outcome	Expert Delphi	FY2 Interviews	Student focus groups
1	Recognise the importance of teaching for their profession and practice	✓	✓	✓
2	Communicate effectively in a teaching context	✓	✓	✓
3	Recognise and carry out their obligations in relation to teaching and learning	✓	✓	✓
4	Support and encourage learners	✓	✓	✓
5	Engage with learners at an appropriate level	✓	✓	✓
6	Demonstrate appropriate teaching skills	✓	✓	✓
7	Enthuse and motivate learners	✓	✓	✓
8	Identify and use informal and unplanned opportunities for teaching	✓	✓	✓
9	Be creative and resourceful in their teaching approach	✓	✓	✓
10	Describe what being a teacher means to them	✓	✓	✓
11	Teach patients	✓	✓	✓
12	Teach peers / colleagues	✓	✓	✓
13	Teach medical students	✓	✓	✓
14	Demonstrate willingness to teach colleagues	✓	✓	✓
15	Teach more junior trainees	✓	✓	✓
16	Teach nurses and other healthcare professionals	✓	✓	✓
17	Mentor more junior trainees	✓	✓	✓
18	Adopt a learner-centred approach to teaching	✓	✓	✓
19	Help learners find ways to address their learning needs	✓	✓	✓
20	Help learners identify their learning needs	✓	✓	✓
21	Negotiate with students areas to be taught	✓	✓	✓
22	Facilitate learner self-assessment	✓	✓	✓
23	Apply their understanding of how individuals learn	✓	✓	✓
24	Help others undertake self-directed learning	✓	✓	**o**
25	Reflect on their own and others' preferred learning styles	✓	✓	✓
26	Apply their understanding of educational theory and principles	✓	✓	**o**
27	Describe their own learning style	✓	✓	✓
28	Adopt a constructivist approach to teaching and learning	✓	✓	✓
29	Demonstrate clinical skills	✓	✓	✓
30	Teach practical clinical skills	✓	✓	✓
31	Teach knowledge-based content	✓	✓	✓
32	Demonstrate and help learners to develop appropriate attitudes	✓	✓	✓
33	Teach communication skills	✓	✓	✓
34	Teach decision-making skills	✓	✓	✓
35	Respond appropriately to learner questions	✓	✓	✓
36	Explain concepts effectively	✓	✓	✓
37	Present information in a structured, logical sequence	✓	✓	✓
38	Effectively use a range of teaching techniques and strategies	✓	✓	✓
39	Break down complex topics into learning points	✓	✓	✓
40	Deal with challenging learner behaviours	✓	✓	✓
41	Use a range of questioning techniques in their teaching	✓	✓	✓
42	Teach using mind maps	**o**	**X**	**X**
43	Define learning outcomes / objectives for a teaching session	✓	✓	✓
44	Evaluate a teaching session	✓	✓	✓
45	Plan a teaching session	✓	✓	✓
46	Lead the delivery of a teaching session	✓	✓	✓

LO number	Learning Outcome	Expert Delphi	FY2 Interviews	Student focus groups
47	Plan and design learning opportunities	✓	✓	✓
48	Deliver formal planned teaching	✓	✓	✓
49	Seek participation from all involved in a teaching session	✓	✓	✓
50	Choose appropriate small group teaching methods	✓	✓	✓
51	Sequence teaching and learning activities to address learning outcomes	✓	✓	✓
52	Gain audience participation / interaction in a large group presentation	✓	✓	✓
53	Deliver one-to-one teaching	✓	✓	✓
54	Teach in clinical situations	✓	✓	✓
55	Teach at the bedside	✓	✓	✓
56	Teach on the ward	✓	✓	✓
57	Teach in a clinical skills unit	✓	✓	✓
58	Teach 'on take'	✓	✓	✓
59	Teach in outpatient clinics	✓	✓	✓
60	Lead a small group tutorial	✓	✓	✓
61	Facilitate experiential and work based learning	✓	✓	✓
62	Teach effectively in a variety of different situations	✓	✓	✓
63	Prepare and deliver a presentation or lecture to a large group	✓	✓	✓
64	Teach in the community	✓	✓	✓
65	Facilitate a problem based learning tutorial	o	✓	✓
66	Teach in theatre	o	X	✓
67	Teach at a distance	o	X	X
68	Organise and run a video or telephone conference	X	X	X
69	Assess formatively	✓	✓	✓
70	Carry out workplace-based assessments	✓	✓	✓
71	Make a global judgement about performance	✓	✓	✓
72	Monitor student progress and achievement of learning outcomes	✓	✓	✓
73	Assess performance using a mark scheme	✓	✓	✓
74	Assess summatively	✓	✓	✓
75	Write assessment questions	✓	X	X
76	Examine in an Objective Structured Clinical Examination (OSCE)	o	X	✓
77	Devise an appropriate assessment for specified learning outcomes	o	✓	o
78	Assess written work and portfolios	o	X	X
79	Set appropriate assessment standards	o	X	X
80	Apply the theory and principles of assessment	o	✓	✓
81	Make appropriate use of computers in assessment	o	✓	✓
82	Participate in a formal Board of Examiners	X	X	X
83	Assess practical clinical skills	✓	✓	✓
84	Assess medical students	✓	✓	✓
85	Assess performance in clinical practice	✓	✓	✓
86	Assess behaviours	✓	✓	✓
87	Assess a peer / colleague	✓	✓	✓
88	Assess attitudes	✓	✓	✓
89	Assess more junior trainees	✓	✓	✓
90	Assess knowledge	o	✓	✓
91	Assess reflective abilities	o	✓	✓
92	Give feedback to their teachers	✓	✓	✓
93	Give feedback to a learner	✓	✓	✓
94	Apply the principles of good feedback	✓	✓	✓

LO number	Learning Outcome	Expert Delphi	FY2 Interviews	Student focus groups
95	Give feedback to their colleagues	✓	✓	✓
96	Give appropriate academic feedback	✓	✓	✓
97	Use a variety of techniques & approaches to provide constructive feedback to others	✓	✓	✓
98	Prepare a PowerPoint presentation	✓	✓	✓
99	Identify and make use of appropriate resources for particular learning outcomes	✓	✓	✓
100	Prepare teaching and learning materials	✓	✓	✓
101	Advise learners on appropriate use of library facilities	✓	✓	✓
102	Evaluate learning resources	✓	✓	✓
103	Make appropriate use of learning technology and the internet for teaching	✓	✓	✓
104	Identify and use multimedia resources in teaching, including images & video	✓	✓	✓
105	Make appropriate use of clinical simulators	✓	✓	✓
106	Design effective educational texts including handouts, protocols and study guides	o	✓	o
107	Contribute to the preparation of multimedia learning resources	o	✓	o
108	Prepare e-learning / online resources	o	X	X
109	Prepare a learning plan and timescale	✓	✓	✓
110	Apply the principles of outcome based education	o	✓	o
111	Select appropriate teaching and learning strategies for given learning outcomes	o	✓	✓
112	Develop and negotiate learning outcomes for an educational programme	X	✓	X
113	Apply the principles of instructional design	X	X	X
114	Apply the principles of curriculum planning and development	X	X	X
115	Design and develop a course or programme of training	X	X	X
116	Implement a planned course or programme of training	X	X	X
117	Select learners for admission to or progression through an educational programme	X	X	X
118	Comply with relevant teaching recommendations and requirements	✓	✓	✓
119	Interpret and comply with relevant training and assessment regulations	✓	✓	✓
120	Follow relevant grievance and disciplinary procedures with their learners	✓	✓	✓
121	Teach to institutional goals	o	✓	✓
122	Appreciate doctor as manager of teaching including quality control	o	✓	✓
123	Appreciate the principles of managing change	o	✓	✓
124	Ensure environments are adequate for learning	o	✓	✓
125	Manage and support teaching	o	✓	✓
126	Develop learning environments and educational facilities	X	✓	X
127	Demonstrate an appreciation and respect for colleagues	✓	✓	✓
128	Appreciate the benefits of a multi-professional approach to clinical teaching	✓	✓	✓
129	Adopt a team-based approach to teaching	✓	✓	✓
130	Contribute to the appraisal of a colleague	✓	✓	✓
131	Engage in inter-professional teaching	✓	✓	✓
132	Conduct a formal appraisal of a colleague	X	✓	✓
133	Behave appropriately as a role model	✓	✓	✓
134	Teach in an ethical and professional manner	✓	✓	✓
135	Demonstrate empathy and respect for learners	✓	✓	✓
136	Demonstrate appropriate attitudes towards teaching	✓	✓	✓
137	Achieve an appropriate balance between teaching and other commitments	✓	✓	✓
138	Seek, receive and act on feedback on their teaching	✓	✓	✓
139	Identify their strengths and areas for improvement in teaching	✓	✓	✓
140	Critically reflect and learn from teaching and learning experiences	✓	✓	✓
141	Take advantage of opportunities to develop their teaching skills	✓	✓	✓
142	Evaluate and enhance the effectiveness of their teaching	✓	✓	✓

LO number	Learning Outcome	Expert Delphi	FY2 Interviews	Student focus groups
143	Demonstrate willingness to develop their teaching skills	✓	✓	✓
144	Engage in continuing professional development as a teacher	✓	✓	✓
145	Undertake significant event / critical incident analysis in relation to teaching	✓	✓	✓
146	Keep abreast of new teaching and learning techniques	✓	✓	✓
147	Engage in the scholarship of teaching	o	X	X
148	Apply the principles of evidence-based medical education	o	✓	✓
149	Encourage high quality research in medical education	o	✓	✓
150	Appreciate the role of teacher as researcher	o	✓	✓
151	Identify, critique and apply insights from the educational literature	o	X	o
152	Be familiar with literature sources on medical education	X	✓	✓
153	Undertake research in medical education	X	X	X

Table 4.7 – Perspectives on core learning outcomes for the UK undergraduate medical curriculum compared by respondent group. Delphi Round 3 mean Likert scores of more than 4.5 (should be core) are indicated by a tick ('✓'), scores of less than 3.5 (should not be core) by a cross ('X'), and scores of 3.5-4.5 (equivocal) by a circle (o). Learning outcomes which the majority of FY2 doctors and medical students thought should be core are indicated by a tick ('✓'), irrespective of whether they thought they had learned it, those which the majority thought should not be core by a cross ('X'), and where opinions were equivocal by a circle (o). Cells have been shaded containing crosses (dark grey) and circles (light grey) to facilitate comparison.

Q3b. Is there a relationship between their perspectives on core learning outcomes and their conceptions of teaching?

The 153 learning outcomes in teaching which participants thought should be core for the UK undergraduate medical curriculum, and the nineteen discrete conceptions of teaching that they collectively espoused, were considerably more numerous than had originally been anticipated in this research. Each of the 49 research participants spontaneously espoused between one and nine conceptions of teaching and suggested between zero and 22 learning outcomes in teaching, and then rated which of the 153 learning outcomes in teaching from the Delphi they thought should be core for the UK undergraduate medical curriculum. The number of possible permutations of relationship within and between these sets of nominal variables is therefore very large, and the sample size relatively small. It was therefore considered to be inappropriate to undertake any form of inferential statistical test or factor analysis (Norman and Streiner 2003; Fielding and Gilbert 2006). Two alternative approaches were used to explore the relationship between participant perspectives on core learning outcomes and their conceptions of teaching, and are described in this section.

i) Is there a relationship between participant's espoused conceptions of teaching and the perspectives of teaching implicit in the LO they think should be core for the undergraduate medical curriculum?

Mapping Delphi LO to the 25 conceptions of teaching

The 25 conceptions of teaching derived from the literature review and participant responses were used as a framework to analyse the 153 learning outcomes derived from the Delphi, and these findings are presented in Appendix 8a. Each LO was categorized against a single conception of teaching which it seemed to implicitly suggest. For most outcomes this was relatively straightforward, however this process also identified some LO which could be categorized with more than one conception of teaching. Such areas of overlap in which LO could have been categorized into two or more conceptions of teaching offered helpful insights into the utility and limitations of the framework of teaching conceptions, and were resolved pragmatically as follows:

1. '*Undertake research in medical education*' could have been categorized into either Scholarship or Science conceptions of teaching. It was decided that all LO related to using existing literature and evidence-based practice would be categorized as Scholarship, and all LO relating to undertaking new research as Science.

2. '*Reflect on their own and others' preferred learning styles*' could have been categorized into either Reflective Practice or Learning Activity conceptions of teaching. It was decided that LO relating to helping the learner reflect would be categorized as Reflective Practice, and LO relating to the teacher reflecting and developing their teaching abilities as Learning Activity.

3. '*Teach in clinical situations*' could have been categorized into either Apprenticeship or Competence conceptions of teaching. It was decided that LO

relating to teaching in clinical contexts would be categorized as Apprenticeship, and that LO relating to teaching in non-clinical contexts as Competence.

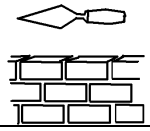
4. '*Select learners for admission to or progression through an educational programme*' did not seem to naturally fall into any conception. It was categorized as 'System' because such selection processes influence who the learners are in any teaching and learning situation, and thus influence all aspects of such a the system.

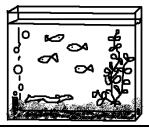
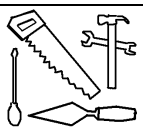
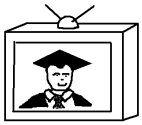
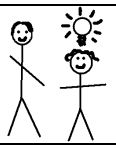
Five of the twenty-five conceptions of teaching did not seem to be represented in the 153 LO from the Delphi. These were: Production (poiesis), Common Sense, Supporting Transformation, Social Reform, and Parent-Child Interaction. The other twenty conceptions of teaching seemed to be represented in the 153 Delphi LO, and also represented in the 111 LO which all three respondent groups thought should be core for the undergraduate medical curriculum.

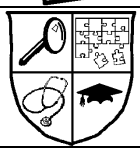
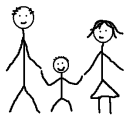
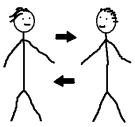
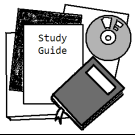
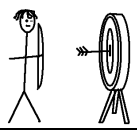
Comparing espoused teaching conceptions with those implicit in suggested LO

Conceptions of teaching espoused by the three respondent groups (i.e. what they said teaching meant to them) were then compared with the conceptions of teaching considered to be implicit in the LO from the Delphi which all three groups of respondents thought should be core for the UK undergraduate medical curriculum. These data are presented in Table 4.8.

Of the twenty conceptions of teaching considered to be implicit in the learning outcomes that all three groups of respondents thought should be core, only seven of these were espoused by all three groups. Five conceptions considered to be implicit in the LO were not espoused by any of the respondent groups, and the remaining eight were espoused by only one or two of the respondent groups.

Number	Pictogram	Conception title and summary	Existing literature	Expert Delphi	FY2 Interviews	Student focus groups	LO from Delphi 3 groups thought should be core
1		**PRODUCTION (*poiesis*)** Making or crafting something using a range of technical abilities (*techne*) to achieve predetermined goals or outcomes.	✓				
2		**PRACTICE (*praxis*)** Deliberating with wisdom (*phronesis*) on what is good for people and conducting yourself appropriately.	✓				✓

Number	Pictogram	Conception title and summary	Existing literature	Expert Delphi	FY2 Interviews	Student focus groups	LO from Delphi 3 groups thought should be core
3		**SCIENCE *(theoria)*** Developing and applying theoretical knowledge and principles (*episteme*) to predict & achieve outcomes.	✓				✓
4		**COMMON SENSE** Teaching is similar to other day-to-day activities and so on the whole needs no particular skills or training.	✓	✓			
5		**ART** Teaching is an original, contingent and personal performance. Good teachers are born, not made.	✓				✓
6		**SYSTEM** Teaching is part of a complex self-regulating system which should consider as a whole.	✓	✓		✓	✓
7		**REFLECTIVE PRACTICE** Help learners reflect and develop skills in reflective practice	✓				✓
8		**COMPETENCE** Number of different techniques and abilities in teaching.	✓	✓	✓		✓
9		**DIRECTING ACTIVITY** Ensuring learners are active, busy and engaged with the process	✓	✓			✓
10		**IMPARTING INFORMATION** Presenting information accurately and completely	✓	✓	✓	✓	✓
11		**TRANSMISSION** Packaging information and presenting it in a way learners can understand	✓	✓	✓	✓	✓
12		**APPRENTICESHIP** Regular interaction, role modelling & feedback. Learner gradually thinks & acts like teacher	✓	✓	✓	✓	✓
13		**FACILITATING UNDERSTANDING** Helping learner understand content so can apply / build on it	✓	✓	✓	✓	✓

Number	Pictogram	Conception title and summary	Existing literature	Expert Delphi	FY2 Interviews	Student focus groups	LO from Delphi 3 groups thought should be core
14		**SUPPORTING GROWTH** Nurturing and creating conditions for growth & development	✓	✓	✓	✓	✓
15		**SUPPORTING TRANSFORMATION** Challenging, supporting & empowering learner with goal of transformation	✓	✓			
16		**SOCIAL REFORM** Challenging norms and assumptions, empowering with goal of social reform	✓				
17		**MANAGED PROCESS** Teaching is a social process which can be managed, measured and audited.	✓	✓			✓
18		**SCHOLARSHIP** Teaching is one aspect of a teachers' academic practice, but closely related to the others.	✓				✓
19		**PARENT – CHILD INTERACTION** Teaching is about facilitating learning through structure, behaviour management, reward and punishment.	✓				
20		**ADULT – ADULT INTERACTION** Teaching is about facilitating self-directed learning by applying adult learning principles to learners & situations.	✓	✓	✓		✓
21		**LEARNING ACTIVITY** Teaching and assessing are excellent learning activities, therefore all learners should be encouraged to teach.	✓	✓		✓	✓
22		**ASSESSMENT** Assessing learner and giving feedback to help them learn	✓	✓	✓	✓	✓
23		**PROVIDING RESOURCES** Identifying and / or developing learning resources	✓	✓			✓
24		**TARGETING LEARNING NEEDS** Helping learners identify and address their own learning needs.	✓	✓		✓	✓

Number	Pictogram	Conception title and summary	Existing literature	Expert Delphi	FY2 Interviews	Student focus groups	LO from Delphi 3 groups thought should be core
25		**GENERATING ENTHUSIASM** Helping learners become engaged, committed and enthusiastic about the subject.		✓	✓	✓	✓

Table 4.8 - Comparison of conceptions of teaching from the literature, those espoused by the three respondent groups, and those implicit in the Delphi LO which all three groups thought should be core for the undergraduate medical curriculum

ii) Is there a relationship between participant conceptions of teaching and their spontaneous suggestions for core learning outcomes in teaching for the UK undergraduate medical curriculum?

Mapping participant conceptions of teaching and suggested LO

Individual participant responses to the question '*What does the term 'teaching' mean to you?*' were re-analysed using the 25 conceptions of teaching in Table 4.8 as an analytical framework. Individual spontaneous participant suggestions for core learning outcomes in teaching for the UK undergraduate medical curriculum were then also re-analysed using the 153 learning outcomes derived from the Delphi as another analytical framework. The learning outcomes arising from the journal article suggested by one Delphi participant were excluded. The responses of each of the 49 participants in this research were thus mapped to between one and nine of these conceptions of teaching, and between zero and 22 of these learning outcomes (Appendix 8b). Mapping responses from each individual to two common frameworks facilitated data analysis for patterns of relationship, as they could then be considered as two sets of variables. The relationship between one or more conceptions of teaching (independent variables) and zero to 22 suggested learning outcomes (dependent variables) could thus be explored for each participant and for each of the three groups.

Cross-tabulating conceptions of teaching with spontaneous suggestions for LO

Individual participant's conceptions of teaching and spontaneous suggestions for core LO were manually entered into two columns of an Excel spread-sheet to be cross-tabulated. Conceptions of teaching were numbered 1-25 (according to Table 4.8) above and entered into the first column as many times as required. For example, there were 55 spontaneous learning outcomes suggested by participants who also articulated conception of teaching number 11 (teaching as Transmission) and so 11 was entered in the first column 55 times. Each learning outcomes spontaneously

suggested by individual Delphi, FY2 and medical student participants and represented by their numbers 1-153 (according to Table 4.6), were entered into the second, third and fourth columns respectively. The additional LO suggested by one Y5 student ('Teach with confidence and experience') was excluded from the analysis. The columns were then cross-tabulated as scatter plots. The resulting scatter plot from the Delphi participants alone is reproduced in Appendix 8c, and the resulting scatter plot which includes all three groups is reproduced in Appendix 8d.

Relating participant conceptions of teaching and spontaneous LO suggestions

The two scatter plots in Appendices 8c and 8d must be interpreted with care. The clustering on conception 13 (Facilitating Understanding) in Appendix 8c, for example, appears to be in part due to this being the conception most commonly articulated by the Delphi experts, and in part due to those articulating it also suggested a large number of learning outcomes. The horizontal repeating patterns are due to individuals who articulated multiple conceptions of teaching and multiple learning outcomes. Each point on the graph may represent a single data point or a number of points superimposed. Spreading these out singly and using bubble charts were useful for analysis, but rendered them unreadable in print and so such charts have not been included in this printed thesis. Also although all participants articulated at least one conception of teaching, seven of them did not suggest any core learning outcomes in teaching for the undergraduate medical curriculum and so their data are not represented in these scatter plots.

With these caveats in mind, some tentative conclusions can be drawn from these cross-tabulations (from the plots in Appendix 8c and 8d and also from manipulating and spreading the live data in Excel). Firstly, it confirms the view that it would be inappropriate to undertake factor analysis or inferential statistics on these data given the large number of nominal variables, wide spread of responses, and relatively small numbers of participants. Secondly, it highlights that some conceptions of teaching, such as 13 (Facilitating Understanding), tend to be articulated by individuals who also suggest a large number of different learning outcomes. Others, such as 15 (Supporting Transformation), tend to be articulated by individuals who only suggest a small number of learning outcomes, and may, therefore, be more discriminatory for future focussed studies of correlation. Thirdly, clustering or consensus between the three groups is evident in certain areas but not others in the scatter plot in Appendix 8d. Such clustering also seems to be more frequent in relation to certain conceptions of teaching (such as 13, Facilitating Understanding) and certain learning outcomes (such as 46, Lead the delivery of a teaching session), than others. Fourthly, there are many gaps in the graphs where there seems to be no apparent correlation between conceptions of teaching and certain learning outcomes. It can be concluded from these results that there appears to be some correlation between individual respondents' espoused conceptions of teaching and the learning outcomes in teaching that they suggest for the UK undergraduate medical curriculum, but there are insufficient data to demonstrate the nature and extent of any such correlation.

Q4. What teaching do recent medical graduates undertake, and what perspective does this offer on core learning outcomes in teaching for the UK undergraduate medical curriculum?

The findings suggest that medical graduates may become involved in a wide range of different types of teaching in the first year following graduation. Most research participants in all three groups expected FY1 doctors to teach, although the majority of FY1 teaching seems to be optional, with one interviewee reporting that they had largely managed to avoid teaching at all in FY1. All three groups of respondents highlighted similarities but clearly distinguished between patient education and teaching healthcare professionals and students. 'Teaching' patients has therefore not been included in these results. The types of teaching FY2 interviewees described delivering in FY1 triangulated well with the types of teaching medical students described receiving from FY1 doctors. Most types of teaching were mentioned by both groups, although some types were only reported by FY2 doctors and a smaller number only reported by medical students. FY2 doctors and medical students distinguished between 'formal' and 'informal' teaching, and an intermediate 'semi-formal' category of teaching could also be differentiated from the data. The findings of this research in relation to the types of teaching FY1 doctors undertake have therefore been grouped into these three categories and are summarised in Box 4.3 above.

Chapter 5: Discussion

Overview

This chapter integrates the research findings with the existing literature to demonstrate how each of the original aims have been addressed, and to highlight the main outputs and contributions made by this research. It also includes reflection on the research participants and methods, the limitations of this research, and areas for further study.

Although the research is appropriately brought to closure in this chapter, it is worth noting that it would still require a significant amount of local negotiation, curriculum development and change management to implement these findings into an undergraduate medical curriculum. Even within the UK, deciding what medical students should learn and how best to prepare them for work as a junior doctor is something of a moving target, with frequent changes to the structure and approach to postgraduate training, changing expectations of junior doctors, advances in medical knowledge and technology, and a shifting socio-political landscape. Exploring stakeholder opinions and seeking consensus on core curricular content for the training of new doctors, as undertaken in this research, is perhaps best considered as part of an on-going process of trying to do things better, and of trying to do better things. The only constant, throughout the history of medical education, seems to be that all of these efforts ultimately seek, however indirectly, to ensure that doctors are better able to provide high quality patient care (Calman 2007). This thesis is offered as a contribution, from a single point in time, to that much larger work.

Reflections on the results

The exploratory methods used in this research resulted in the collection of much more data than can be reported in a single thesis. Some results were anticipated, such as the diverse opinions on what, if anything, medical students should learn in relation to teaching as part of the undergraduate medical curriculum. Other results went considerably beyond what had been anticipated, such as the 25 different conceptions of teaching identified, the 153 learning outcomes in teaching suggested by participants for the undergraduate medical curriculum, and the variety of teaching currently undertaken by FY1 doctors. Arguably these three results, the frameworks of teaching conceptions, learning outcomes in teaching, and types of teaching undertaken by recent medical graduates, are the most substantive outputs from this research. Each builds significantly on the previous literature in this area, addresses in part the original aims of this research, and is likely to have applications beyond the scope and context of the current research. The last section of Chapter 4 demonstrated how the research questions, and thus the gaps in the literature identified in Chapter 2, have been addressed by this research. Some data were also collected which did not specifically address the research questions, including exploration of how prepared medical graduates currently feel for the teaching they undertake, and data relating to teaching, learning and assessment methods through which students might achieve the learning outcomes suggested. These are not reported here, but will serve as useful starting points for future research and curriculum development.

Addressing the aims of this research

In this section the research findings are discussed in relation to the three aims outlined in Chapter 1, and are integrated with the existing literature.

1. What learning about teaching means

The first aim of this research was '*To explore what learning about teaching as part of the undergraduate medical curriculum means in the UK context*'. Rather unsurprisingly, the findings suggest that this *means* many different things to different people. When asked directly, participants in this research expressed complex multi-faceted perspectives about what teaching means to them, most of which could be mapped to conceptions of teaching identified in the existing literature (Appendix 8b). These key stakeholders in the UK undergraduate medical curriculum also articulated a conception of teaching which was not identified in the literature – that of teaching as '*Generating Enthusiasm*' (Figure 4.1). Retrospectively searching for this in the literature revealed multiple related comments, reflections and research findings (e.g. Sutkin *et al.* 2008; Martin *et al.* 2000; Gough and Beckett 2006), but it does not seem to have been previously articulated as a discrete conception of teaching. Five conceptions of teaching were identified in the literature and not articulated by participants, but were considered to be implicit in the learning outcomes in teaching some participants thought should be core for the UK undergraduate medical curriculum. Three others were neither articulated by participants, nor implicit in the learning outcomes they thought should be core (Table 4.8). Of these, the absence of teaching as '*Production (poiesis)*' and teaching as '*Parent-Child Interaction*' may reflect a deliberate trend towards more participative, adult, learner-centred approaches of teaching (Knowles 1968; Knowles *et al.* 2011). The third, teaching as '*Social Reform*', seems quite different however, and is considered further here.

Despite Kember's (1997) view that the conception of teaching as '*Social Reform*' was inappropriate in higher education, many other academics consider this to be a very important aspect of higher education (e.g. Nixon 2004; McLean 2006; Walker 2009). As Pratt *et al.* (2001, p3), writes, "Good teachers awaken students to the values and ideologies that are embedded in texts and common practices within their discipline". The importance of doctors feeling empowered to challenge seniors or existing practices in order to protect patients have been highlighted in the findings of two recent public inquiries into tragedies in the UK health service. The 'Bristol Inquiry' found that the deaths of between 30 and 35 children on one cardiac surgery unit might have been prevented had medical staff felt empowered to act on their concerns, reporting that "A career depended on someone's 'fit' within the 'club', rather than performance… any challenge to policy was perceived as disloyalty" (Kennedy 2001, p201). The 'Shipman Inquiry' similarly found that Dr Shipman, a general practitioner who is thought to have murdered approximately 250 patients over his career, could have been stopped earlier had colleagues felt empowered to act on their concerns (Smith 2005). It recommended that "Staff should be encouraged to bring forward any concerns they may have openly, routinely and without fear of criticism" (Smith 2004, Recommendation 34). Whilst such tragedies are clearly multi-factorial, there is a strong message in the inquiry reports that doctors need to recognise and be prepared to challenge practices which they feel are unacceptable, with the implication that such empowerment needs to be built-in to their training.

Medical practice in the UK is a long-established, influential and generally highly-regarded profession, with a strong sense of identity, culture, tradition and values (Calman 2007; Salter 2001; Coburn and Willis 1999). Such professional power, harnessed in the service of patient interests, can result in considerable benefits to individuals and society as a whole, but may also be subject to misuse (Coburn and Willis 1999; Garner 1979). The absence of the conception of teaching as '*Social Reform*' from the research data might suggest that participants did not consider teaching to include empowering students and trainees to challenge practices which they find unacceptable. Given the findings and recommendations of Bristol and Shipman inquiries, these results give some cause for concern and highlight a need for further exploratory research in this area. Promoting this conception of teaching may lead to teachers encouraging medical students and trainees to openly give and receive feedback with any colleague, to respectfully and appropriately challenge the existing system, and to the best of their ability stand up for patient rights, patient safety and the good of society as a whole.

2. Perspectives on core learning outcomes in teaching

The second aim of this research was '*To seek a range of perspectives on core learning outcomes in teaching for UK undergraduate medical curricula, and to consider potential influences on these perspectives*'. All of the learning outcomes in this research are social constructs – tools to help stakeholders in a curriculum understand, communicate and negotiate core content of the undergraduate medical curriculum in relation to teaching. They are offered to promote further discussion, reflection and exploration, and however detailed could never fully describe all that an individual will need to learn in order to be able to teach. This research offers perspectives from the existing literature relating specifically to learning outcomes in teaching for UK undergraduate medical curricula (Table 2.1); other relevant literature such as that on core learning outcomes and competencies in teaching for doctors during or after specialist training (e.g. Appendix 1); the spontaneous views of experts in medical education, recent graduates and current students (Box 4.1 and Table 4.6); the views of these three groups on each item in a list of learning outcomes (Table 4.7); and greater understanding of the types of teaching which recent graduates are likely to undertake (Box 4.3). As the great majority of UK medical graduates immediately go on to work as FY1 doctors, such understanding enables learning outcomes and assessment to be 'blueprinted' on to the abilities that will be required immediately after graduation – often referred to in the medical literature as ensuring graduates are 'fit for purpose' or 'prepared for practice' (Evans and Roberts 2006; Wass 2005).

There are many potential influences on individual perspectives on core learning outcomes in teaching, but two were particularly highlighted in the literature and seemed appropriate to explore in this research. The first was stakeholder group, reflecting differences in experience and background, and the second was their conception of teaching. Most previous research identified in the literature found different perspectives on learning outcomes depending upon stakeholder group. The Tuning Project (Medicine), for example, found some differences in perspective between academics, graduates, employers and students (Cumming and Ross 2008; Cumming and Ross 2007a). In the current research, the perspectives of academics, graduates and students were sought and compared, revealing significant differences between these groups in their spontaneous suggestions (Box 4.1 and Table 4.6).

Stakeholder group seemed to have much less influence on individual perspectives when asked to indicate whether individual listed learning outcomes should be core or not, on which opinions were remarkably similar irrespective of experience and background (Table 4.7). The literature also suggests that an individual's conception of teaching will influence learning outcomes in teaching, or what they think novices need to learn in order to be able to teach (e.g. Squires 1999; Korthagen *et al.* 2001). This is supported by expert responses in the current research relating to the meaning of the term 'teaching', which aligned very closely with their responses to a question on what 'learning to teach' means. More detailed cross-tabulation of participant's espoused conceptions of teaching with their spontaneous suggestions for core learning outcomes in teaching for the UK undergraduate medical curriculum, however, revealed a very complex relationship between these two variables (Appendix 8). Additionally, individual espoused conceptions of teaching did not necessarily correlate well with the conceptions of teaching implicit in the learning outcomes participants thought should be core, nor with their opinion on whether or not medical students should learn to teach (Table 4.10, Appendices 6 & 7). These findings support the assertion that conceptions of teaching have some influence on individual perspectives on core learning outcomes in teaching, but it has not been possible to explore the nature and extent of any such influence in the current research. A number of other potential influences on the perspectives of learning outcomes in teaching for the UK undergraduate medical curriculum were also identified in this research but not explored in more detail. These include the geographical location and cultural background of respondents, and their different interpretations of the meaning of questions and learning outcomes (highlighted by a number of findings in this research), publication bias and socio-political influences on the literature, and the teaching opportunities available for recent medical graduates.

3. Synthesis of core learning outcomes in teaching

The third aim of this research was '*To synthesise the findings and consider whether they could be used to develop a research-informed framework of core learning outcomes in teaching for UK undergraduate medical curricula*'. The list of 153 learning outcomes from the Delphi were used to good effect as a 'quantitative instrument' in the FY2 interviews and student focus groups (Schifferdecker and Reed 2009), and facilitated comparison and synthesis of perspectives between these three key groups of stakeholders. Each perspective on learning outcomes from this research, including the 153 learning outcomes, the 111 which all three groups thought should be core (Table 4.9), the spontaneous suggestions from each of the groups (Box 4.1 and Table 4.6), the synthesised competencies for more senior doctors involved in teaching (Appendix 1), or the types of teaching which FY1 doctors are likely to undertake (Box 4.3), could potentially be used alone to inform curriculum development. A much more robust approach, however, would be to draw on all of these perspectives and to triangulate between the findings. As Schifferdecker and Reed (2009, p641) reflect, "The researchers could have chosen a solely qualitative or quantitative approach to address their research question. However, the combination of approaches allowed them to enhance the relevance, depth, applicability and triangulation of their research findings".

Mapping the types of teaching undertaken by FY1s (Box 4.3) to the learning outcomes which different groups of respondents thought should be core (Table 4.7)

reveals a substantial mismatch between these findings however. For example, all three groups thought that many learning outcomes relating to assessment (LO 69-74 and 83-89 in Table 4.7) should be core for the undergraduate medical curriculum, but no FY2s reported having been involved in assessment in FY1, and only one student reported having been assessed by an FY1. All three groups also thought that understanding the principles of instructional design and being able to plan and implement a course (LO 113-116 in Table 4.7) should not be core for the undergraduate medical curriculum, yet both FY2s and students reported FY1s developing and delivering planned teaching (teaching types 2b, 3a and 3e in Box 4.3). There are various possible explanations for such discrepancies, such as stakeholders suggesting learning outcomes aimed at preparing students for practice after FY1, reporting bias or limited availability of opportunities to undertake certain forms of teaching in FY1, or a mismatch between what respondents think should happen and what actually happens at the current time. When synthesising these research findings to inform a set of learning outcomes for an undergraduate medical curriculum, however, multiple judgements have to be made about which perspectives to prioritise, and which learning outcomes to select if there is a discrepancy. For example, judgements would have to be made whether to only use learning outcomes which triangulate between all three data sets, whether the perspective of the teaching undertaken by graduates should take priority over the opinions of all three groups, whether expert opinions should take priority over those of students, and whether any of these new research findings should take priority over the existing literature and local faculty perspectives. The findings of this research can inform such judgements, but cannot replace the need for judgements to be made, or absolve curriculum developers of their responsibility to select, review and find ways to address appropriate core learning outcomes for their curricula. In the planning stages of this research it was anticipated that one of the outputs might be a single research-informed framework of core learning outcomes in teaching for UK undergraduate medical curricula. As work has progressed, however, this has seemed a less appropriate goal. This third aim of this research has been addressed insofar as the findings can clearly be used to develop a research-informed framework of core learning outcomes in teaching for UK undergraduate medical curricula. To go on and do this before reporting the separate findings, however, would reduce the value of these data in terms of their utility, depth, and potential applications in other contexts (Larsson 2009). It would also necessitate judgements being taken by the researcher rather than, perhaps more appropriately, national bodies such as the GMC, the Medical Schools Council, the Scottish Deans, and those responsible for developing and managing local undergraduate medical curricula across the UK.

Other emergent issues

In addition to the original aims of this research, a number of other relevant issues emerged from analysis of the data, including disparity between espoused and implicit conceptions of teaching and the identification of many more conceptions of teaching than have been identified in previous studies which are explored here.

1. Disparity between espoused and implicit conceptions of teaching

There was no clear correlation between the conceptions of teaching implicit in the Delphi learning outcomes that all three groups considered to be core, and the conceptions of teaching which participants espoused when asked directly (Table

4.10). One possible explanation is that when asked directly about their conception of teaching participants may have responded in a habitual or learned way without much deliberation, and that if asked in a different way or encouraged to take more time to think about it their responses may have been different. However, most responses appear to be detailed and considered, suggesting that participants did deliberate about them at some length. A more intriguing possibility is that the conceptions of teaching which participants use when considering what they think students should learn in relation to teaching are actually different to the conceptions of teaching they think they use. This relates to Agyris and Schön's (1974) distinction between '*espoused theory*' and '*theory-in-use*', which they describe as follows:

> "When someone is asked how he would behave under certain circumstances, the answer he usually gives is his espoused theory of action for that situation. This is the theory of action to which he gives allegiance, and which, upon request, he communicates to others. However, the theory that actually governs his actions is his theory-in-use, which may or may not be compatible with his espoused theory; furthermore, the individual may or may not be aware of the incompatibility of the two theories. We cannot learn what someone's theory-in-use is simply by asking him. We must construct his theory-in-use from observations of his behavior" (Argyris and Schön 1974, pp6-7).

Kane *et al.* (2002) are similarly critical of research which focuses only on what university teachers say about their practice and their espoused conceptions of teaching but do not directly observe what they do to identify their implicit theories-in-use. A recent study of medical teachers found Argyris' subsequent work on 'Model I' and 'Model II' theory would also predict that an individual's theory-in-use would be more teacher-centered and their espoused conceptions more learner-centered (Argyris *et al.* 1985; Dick and Dalmau 1990), but the results of the current research (Table 4.10, conception numbers 10-14) are insufficiently discriminatory to demonstrate this. It does, however, raise interesting questions about the relationship between espoused and implicit conceptions of teaching which would be fertile ground for future research.

2. More conceptions of teaching identified than in previous studies

This research identified twenty-five discrete conceptions of teaching, whilst previous studies have identified no more than eight (Squires 1999). Of the existing literature, Pratt's (1992; Pratt and Associates 1998) five conceptions of teaching seem to have the most extensive research evidence in support of them. They have also been developed into an online tool to help teachers self-assess their conceptions of teaching known as the '*Teaching Perspectives Inventory*' (Pratt *et al.* 2001), which has been used in subsequent research (e.g. Deggs *et al.* 2008; Jarvis-Selinger *et al.* 2006). Pratt's (1992) original research used what he referred to as a 'phenomenographic' approach, with an existing theoretical framework and model of teaching conceptions, to interview 218 teachers of adults, and 35 other adults who were not teachers, in Canada, the United States, China, Hong Kong and Singapore. He distinguished five conceptions of teaching in the data on the basis of different

beliefs, intentions and actions, and also on the basis of the predominance of different elements and relationships between elements in his existing framework and model. As Pratt (1992, p209) observes, "Because the research started with an analytical framework and general model of teaching, respondents' understanding of teaching was, in part, understood within, and perhaps shaped to fit, that a priori framework and model". Although the current research collected data in a single country, from a smaller number of respondents, it also sought conceptions of teaching in the existing literature as well as in the research data, used a variety of other research methods in addition to semi-structured interviews, and used a grounded theory approach rather than an a-priori framework and model.

In the current research, the definition of what constitutes a distinct 'conception' of teaching remained purposively broad, and so it is not surprising that a larger number of conceptions of teaching were identified than in previous studies. Where conceptions of teaching seemed to clearly map to each other in the current research, such as Pratt's (1992) conception of teaching as 'social reform' and Robson's (2006) conception of 'critical pedagogy', these have been synthesised. Where conceptions of teaching seemed to be related but subtly different however, such as the conceptions of teaching as 'science' and 'scholarship', or the conceptions of teaching as 'competence' and 'managed process', these have not been combined. Further research will be required to determine whether others would recognise all 25 of the ways of thinking about teaching in the current research as separate 'conceptions'. Factor analysis could also help to determine if all of these can be considered as separate conceptions, or if some can be synthesised or grouped together.

Reflection on the research participants and methods

The three groups of participants in this research were considered to be key stakeholders in UK undergraduate medical curricula. The junior doctor and medical student respondents were selected purposively for maximum variation in factors which were thought likely to influence their opinions on medical students learning about teaching, albeit within a single region and institution respectively. The differences in perspectives between the three groups is reflected most strikingly in their spontaneous suggestions for undergraduate learning outcomes in teaching and their espoused conceptions of teaching, although is less apparent when they were asked to indicate whether individual listed learning outcomes should be core or not. Because the three groups of participants were recruited by their role in relation to the undergraduate medical curriculum, it was assumed that their experience of medical practice, medical education and teaching would reflect these roles. The demographic data, however, suggested that the three groups were not as homogenous and separate as had been expected. For example, some of the experts responsible for postgraduate programmes in medical education were not medically qualified, and so may have less experience of medical education than the student group. Some of the medical students also seemed to have had more experience of teaching than a number of the FY2 doctors interviewed. There was also a potential generation gap between the experts, all of whom had been involved in medical education for over ten years and 44% for over twenty years, and the junior doctors and medical students who had a median age of 23 and 25 years respectively. Such generational differences are thought to influence approaches to teaching and learning (Twenge 2009; Norman

2011), and may have had an impact on the differences findings between these groups irrespective of their level of experience.

Various research methods were identified in the literature which had been used to inform the development of learning outcomes, but none were considered to be a 'gold standard' for this purpose. The methods used in this research were primarily selected on what seemed most appropriate for each of the three groups of participants. As discussed in Chapter 3, alternative methods could have been used for each group, or the same selected method could have been used with all three groups. It would, for example, have taken significantly less time to gather data from the expert group with a singe round survey, although this would probably have resulted only in the 144 learning outcomes synthesised from Round 1 of the Delphi and would not have allowed for any predetermined measure of consensus on these to be achieved by the expert group. Interviews with these experts, in person or by telephone or video-conferencing, might have given them more opportunity to express themselves more fully, but the Delphi allowed them unlimited time to structure and reflect on their responses, even to refer to the literature if required, and seems to have been a key factor in their producing what they and other respondents considered to be a comprehensive list of learning outcomes. Interviews with FY2s yielded particularly rich data, and it is difficult to envisage a more effective research method to explore the perspectives of this group. It may be useful to expand on this in future research, however, by asking FY1 doctors to keep reflective diaries or blogs, and observing or recording the teaching they deliver. Conducting additional focus groups with more medical students may have generated additional useful data, however there were already considerable similarities between the responses of the three groups which were selected for maximum variation, and so the 12 student participants seemed sufficient for the current study. Comparing the medical student focus groups to the FY2 interviews, the question also arises as to whether richer data may have been generated had the students been interviewed individually. Whilst this may have resulted in more detailed individual conceptions of teaching, and example of teaching received by students, it would also have precluded the interactive discussion, mutual-prompting and peer support which was so evident in each of the focus groups, and thus may have resulted in students feeling inhibited and being less forthcoming in their responses.

In retrospect, the participant groups and methods selected do seem to have been very appropriate for achieving the aims of this research, and the sequence in which they were undertaken enabled each new approach to data collection to build upon the previous ones. The Delphi learning outcomes were useful in prompting participant responses in the interviews and focus groups, and the list of teaching undertaken by FY2s in FY1 was a helpful framework for analysing and synthesising the teaching that students reported having received from FY1s. Some FY2s and students also said that they had found it helpful to reflect on the list of Delphi learning outcomes for their own learning, in addition to the usefulness of contributing to this research. Whilst this research does not suggest one definitive method of data collection to inform the development of learning outcomes in medical education, it does offer an example of a sequential, mixed-method approach which seems to have been very effective. It seems unlikely that any one of the three main research methods used in this research would have individually resulted in the same breadth and richness of data that has been obtained through the mixed methods approach that was adopted.

The findings from the combination of different participant groups and methods used in this research seem to have resulted in a whole which is greater than the sum of its parts.

Limitations of this research

A number of limitations of this research were identified. Some of these, relating to the literature review, participant groups and research methods, have already been discussed in detail elsewhere. Others deserve special mention and are outlined below:

'Learning about teaching' and related concepts

In this research, the literature was reviewed and research data were analysed with the emphasis on identifying conceptions of teaching rather than conceptions of what it means to be a teacher. These two are often distinguished in the literature, however, and many of the junior doctors and medical students in this research also highlighted the difference between teaching and being a teacher. Some also perceived a distinction between learning about teaching in a theoretical sense and gaining some personal experience of teaching. Such distinctions are sometimes considered to be merely semantic. It is quite possible, however, that the wording of questions asked, and of invitation letters and information sheets may have influenced participants' decisions to respond and influenced the responses they gave. For example, none of the FY2 doctors mentioned assessing students whilst in FY1, but it is difficult to know if they have not done so or whether they did not consider assessment to be a form of teaching. Perhaps if they had been asked specifically about assessment they might have responded differently. It is not possible to discern retrospectively precisely how the wording of questions and research materials may have influenced the findings of this research, but it seems likely that they will have to some extent.

FY2 and medical student participants all from the researchers' own region

Members of the Delphi panel were sampled from across the UK, but the FY2 interviewees all worked in a single region of the UK (South East Scotland) and the medical students were all studying at The University of Edinburgh. It could be argued that these groups are not representative because of the opportunities they have to participate in training and teaching as part of the local undergraduate Peer Assisted Learning (PAL) programme (discussed in Chapter 1) and the South East Scotland Foundation Doctor Teaching Scheme (discussed in Chapter 2, Part 3). It might also be argued that the researchers' own previous involvement in both of these initiatives may unduly bias the responses of these participants, or the way in which data were reported. There are, however, considerable advantages of having undertaking the research in this region, including the researchers' familiarity with the local hospitals, undergraduate and foundation curricula, teaching and learning approaches, the PAL programme and the Foundation Doctor Teaching Scheme – all of which facilitated access to participants, data collection and analysis. Also because many participants had at least some exposure to teaching or teacher training, they may be considered to be in a better position to comment on it than if they had no exposure at all, and may also be better placed to suggest learning outcomes which would best prepare students to teach.

Could have explored additional perspectives
On reflection, it may have been useful to have sought the perspective of 'employers' of medical graduates, as defined in the original Tuning methodology (Gonzalez *et al.* 2003; Gonzalez *et al.* 2005). As discussed in Chapter 3, however, these are a particularly difficult group to reliably define and differentiate from 'academics'. It would also have been interesting to seek perspectives from undergraduate medical curricula in other countries and from other disciplines in the UK, although the research had to remain manageable. The three participant groups in this research were chosen because their perspectives were thought to be most likely to address the research questions. Many other perspectives remain to be explored in future research.

Three sets of data are not entirely comparable
Although many of the findings of this research, particularly Section IV of Chapter 4, compare, contrast and attempt to triangulate the findings from three different sets of data, these findings are not entirely comparable. Data from the three different groups were collected using different methods. As highlighted above, Delphi experts could reflect on, draft, rewrite and structure their written responses in as much time as they wished, whereas FY2 interviewees and medical students had to respond verbally and spontaneously to questions posed by the interviewer. FY2 interviewees may have responded more or less openly to questions when interviewed alone than the medical students did when asked in focus groups with their peers. Using the same research method with each group would have enhanced comparability between these findings, but priority was given in this research to selecting what seemed to be the most appropriate method for each group. Any comparisons that have been drawn between the findings, therefore, remain tentative and exploratory.

Too small a sample to analyse results statistically
There were 49 participants in this research in total, twelve of whom participated as members of focus groups. The research generated 25 discrete conceptions of teaching and 153 specific learning outcomes in teaching, with very large numbers of potential combinations of these. It was not possible, therefore, to correlate these two nominal variables using inferential statistics or to undertake factor analysis of the conceptions or learning outcomes. If this potential correlation were to be explored statistically in future research, it may be possible to use the findings of the current research to do a power calculation to estimate the required number of participants.

Overlap between some identified learning outcomes
A number of participants highlighted areas of overlap or similarity between some of the 153 learning outcomes from the Delphi. For example the perceived areas of overlap between the various specific learning outcomes on feedback (numbers 92-97), and also those on resources (numbers 99, 102, 104, 107 and 108). These all arose from the Delphi data and seemed at the time to be distinct, and this is supported by the different ways in which they have been rated by all three of the respondent groups. It may be possible, however, to review these in the light of the results and to synthesise some into a smaller number of more discrete learning outcomes, arrange them into a more accessible structure, and find alternative terms for those which some participants found particularly confusing such as 'instructional design', 'scholarship' and 'constructivist'.

Defining a moving target
Aligning the undergraduate medical curriculum with FY1 practice can be likened to aiming at a moving target. Since work began on the current research, the GMC have released a new version of *Tomorrow's Doctors* (GMC 2009b), published guidance for FY1 training called *The New Doctor* (GMC 2009a), and published a new version of *Generic Standards for Speciality including GP Training* (GMC 2010d). The UK Foundation Programme Curriculum has been updated (UKFPO 2010), the application procedures for FY and ST training have been revised, and a number of 'Academic Foundation Programme' training posts involving substantial teaching commitments have become available (NHS 2011a). As well as changes in policy, opinions of participants and opportunities for junior doctors to become involved in teaching are likely to change over time. The teaching undertaken by FY1 doctors working in South East Scotland in 2009-10 reported in the current research, for example, is now the best available evidence on the teaching undertaken by UK doctors in the year after graduation. If it were repeated next year even in the same region, however, the findings might be quite different.

Subjective data analysis
All qualitative data analysis is subjective, although certain aspects of the current research, such as mapping learning outcomes from the expert Delphi to conceptions of teaching (Appendix 8a), were undertaken by a single researcher, and have so far only been verified by a second (supervising) researcher, and reviewed by those who read and offered comments on earlier drafts of this thesis. Because the conceptions of teaching and learning outcomes will have different meanings and implications to different people, such mapping would ideally be undertaken by a diverse range of purposively selected individuals. The mapping exercise would probably be less neat and ordered, but the results would then be socially constructed and therefore more likely to be credible and transferable to other contexts. For pragmatic reasons this was not undertaken as part of the current research, but may be repeated again in this way in future research.

Contribution to knowledge and the literature

This research contributes to the literature in a number of areas, particularly around the gaps in the literature identified in Chapter 2, as summarised below:

1) There was a lack of information on how teaching is conceptualised by those involved in the undergraduate medical curriculum. This research contributes findings about how three key groups of stakeholders in the undergraduate medical curriculum conceptualise teaching. These findings, together with the review of the literature, also contribute a framework of 25 discrete conceptions of teaching. This framework has already demonstrated its utility in the current research in analysing, comparing and synthesising conceptions of teaching in the literature, in analysing participants' espoused conceptions of teaching in response to the question '*What does the term 'teaching' mean to you?*', and in analysing the conceptions of teaching which seem to be implicit in the learning outcomes they suggested. Although there are plans for further research and factor analysis on these 25 conceptions of teaching, they have already been used successfully in staff development at The University of

Edinburgh, to help medical teachers reflect on and discuss their own conceptions of teaching.

2) There was a lack of information on how such conceptions might influence their perspectives on what medical students should learn in relation to teaching. Although the relationships between individual conceptions of teaching and perspectives on what medical students should learn in relation to teaching were explored as part of this research, the variables were too numerous and the sample size proportionately too small to demonstrate conclusively any relationship between them. The exploration itself, and the apparent misalignment between participants' espoused and implicit conceptions of teaching (Table 4.8), do contribute useful findings to the literature however, and also help define areas for further research.

3) It was not known whether medical students and junior doctors typically recognise that teaching is likely to be part of their role by the time they have completed or nearly completed specialist training. The results of this research suggest that both medical students and junior doctors do recognise that teaching is part of the role of senior doctors, and when asked all participants from both groups said they thought teaching would be part of their job in ten years time. These insights usefully add to the existing literature and will be helpful information particularly for those who are involved in training medical students and junior doctors to teach.

4) It was not known whether medical students and junior doctors see teaching as part of their current role. Almost all of the junior doctors and some of the medical students involved in this research saw teaching as part of their current role. Some of those who saw teaching as part of their current role would not describe themselves as a 'teacher' however. Some individuals in both groups considered someone who teaches to be a teacher, but others said they would need to know more, to be more senior, to have received training in teaching, or to have teaching as part of their job description before they would consider themselves to be a teacher. This raises interesting questions about the development of professional identity, role separation and the nature of clinical teaching, all of which are fertile ground for future research.

5) It was not known what teaching medical graduates might undertake or be expected to undertake without receiving additional training. This research identified various types of teaching undertaken by FY1 doctors in a single region of the UK, with triangulation of findings between those who delivered and those who received the teaching. It has also grouped these into 'formal', 'semi-formal' and 'informal' types of teaching. Greater knowledge of the teaching undertaken by junior doctors will help those responsible for undergraduate medical curricula to better ensure their graduates are fit for practice. Such insights can also help them prioritise, refine and exemplify learning outcomes in teaching – enabling them to move away from broad aspirational statements toward more tangible competencies which can be learned and practised by medical students, then demonstrated through formal assessment. It could also help medical students and junior doctors themselves to reflect on their teaching experiences, to identify areas they would like to develop or opportunities they would like to take up, and to gather and present evidence for their teaching experiences for appraisal purposes and job applications.

6) There was insufficient data for the development of a research-informed framework of core learning outcomes for UK undergraduate medical curricula. The aims of this research have been achieved in terms of generating sufficient data which could be used to inform the development of a research-informed framework of core learning outcomes in teaching for UK undergraduate medical curricula, but for a number of reasons, outlined above, it was decided not to go on and actually synthesise such a framework as part of this thesis. The list of 153 learning outcomes in teaching arising from the Delphi have already demonstrated their utility during the FY2 interviews and student focus groups, and this research has found that a sample of experts in medical education, recent graduates and current medical students think 111 of these should be core for the undergraduate medical curriculum. The list of 153 learning outcomes may also have many other applications in research, curriculum development and as an aid to reflection and professional development. At least one of the participants thought that the list would be useful all the way up to consultant level, and it might be useful as a focus for debate and a resource for further research when considering learning outcomes and competencies in teaching for doctors at other stages in their training, and possibly also in related disciplines.

7) It was not known which research methods would be most suitable to inform the development of core learning outcomes in medical education. This research has demonstrated that a sequential, mixed-method approach can be very effective in generating data which can usefully inform the development of core learning outcomes, and contributes a practical example of such an approach to the literature which others could follow or develop. Whilst not proposing a definitive approach, there are some general insights from this research experience that usefully add to those previously reported in the literature. It is proposed that the development of future learning outcomes be informed by research involving different stakeholder groups, and that such research would ideally use sequential mixed methods which combine both qualitative and quantitative data collection. The sequence of these mixed methods, and how data collected might inform the next stage of the process, also seems to be important to the outcomes, and it is worth spending time deliberating this in the planning stages of the research.

(this page is intentionally blank)

Chapter 6: Conclusions and Implications

Conclusions

A number of conclusions can be drawn from this research. These include:

Conclusion 1 – medical students should learn about teaching as part of the undergraduate medical curriculum. The general weight of opinion in the literature, and from the three key stakeholder groups consulted in this research, is that medical students should learn about teaching as part of the undergraduate medical curriculum. This opinion is contested however, with at least one participant in each group stating that they think medical students should not learn about teaching.

Conclusion 2 – research data can offer useful perspectives to inform learning outcome development in medical education. This research has resulted in rich data which can be used in the development of learning outcomes in teaching for the UK undergraduate medical curriculum, and also an example of a sequential mixed-methods research approach which could be applied or adapted to the development of learning outcomes in other areas.

Conclusion 3 – learning outcomes seem to be a convenient and acceptable way to define, and to engage stakeholders in discussions about, curricular content. Almost all of the participants in this research seemed to be familiar and comfortable relating to curricular content as expressed by intended learning outcomes. Relatively few learning outcomes or topics to be covered in relation to teaching were suggested spontaneously by participants in this research, however asking them subsequently to consider a list of existing learning outcomes helped them to engage and provide their perspective on a much wider range of topics, and also resulted in greater consensus in responses both within and between participant groups.

Conclusion 4 – There seem to be at least 25 discrete ways in which teaching can be conceptualised, and individuals often seem to use and espouse multiple different combinations of these. 25 conceptions of teaching were identified in this research, and individual participants espoused between one and nine of these. It is highly likely that when discussing teaching, even amongst peers with similar background and experiences, each individual will have a very different conception of what 'teaching' actually means to them.

Conclusion 5 – FY1 doctors are involved in more types of teaching than has previously been recognised in the literature. This finding, and the list of different types of teaching which FY1 doctors undertake, will be particularly useful when considering the preparation that medical students require in order to teach effectively as an FY1. It may also be useful when considering Foundation doctor job plans and further training for Foundation doctors.

Implications for practice

This research has implications for practice in the undergraduate medical curriculum, for the Foundation curriculum and for policy, and may have wider implications for faculty development of medical teachers. Firstly, the General Medical Council have already stated that all UK medical graduates must be able to teach, although quite what this means in relation to what they should be able to do, with whom, and to what level, has remained unclear. This research will help to clarify and inform decisions in relation to these issues. The implication of this is that those involved in undergraduate medical education, including the researcher, can now apply these research findings and try to implement the GMC requirements in their local curricula. Secondly, this research has also helped to clarify what teaching is currently undertaken by a sample of FY1 doctors, and so has implications for the Foundation programme in terms of their job descriptions, support, training and possibly also assessment. It is suggested that the teaching FY1 doctors undertake can and should be recognised by those who are responsible for their activities. Thirdly, the findings are likely to be of interest to the General Medical Council and other regulatory bodies. The implications being that these findings might help them to clarify precisely what they expect from UK undergraduate medical curricula, and may also inform subsequent policy and guidance in this area. Fourthly, this research has resulted in a list of 153 specific learning outcomes in teaching and a framework of 25 conceptions of teaching, both of which could have applications beyond the aims of this research. The implication being that these are potentially useful multi-purpose tools, the applications of which are likely to far exceed the initial scope of this research, for example in faculty development. Such potential applications are beyond the scope of the current research, but will be explored at a later date.

Areas for further research and development

A number of areas for further research have already been highlighted throughout Chapters 5 and 6. However, this research is likely to be developed, at least initially, in the following four areas:

1. Wider consultation on the learning outcomes in teaching identified in this research. This may possibly take the form of a larger survey which combines the 111 learning outcomes all three groups considered to be core with the learning outcomes implied by the teaching undertaken by FY1 doctors.

2. Consideration of how to implement learning outcomes considered to be core in the UK undergraduate medical curriculum. Firstly this is likely to take the form of a local mapping exercise to determine where in the Edinburgh curriculum any of the suggested learning outcomes are already being achieved, and which are not currently being achieved. Subsequently it could involve collecting examples of teaching, learning and assessment for each of these learning outcomes from different institutions, and exploring ways in which students could achieve each of the learning outcomes.

3. Further exploration of the framework of 25 conceptions of teaching, ideally with individuals involved in general education as well as those specialising in medical education. It would be helpful to explore whether others would consider the framework to be useful in helping them reflect on their own

conceptions of teaching, whether they would consider it as an analytical framework to use in further research, and whether they would recognise all 25 of the ways of thinking about teaching in the current research as separate conceptions. It would also be useful to undertake factor analysis to determine whether all of these can be considered as separate conceptions, or if some can be synthesised or grouped together.

4. Further exploration of medical teacher's espoused conceptions of teaching in relation to the conceptions of teaching implicit in learning outcomes they suggest and their approaches to teaching, learning and assessment.

5. Some form of observation or reflection on the types of teaching undertaken by FY1 doctors, with which to triangulate the findings from the current study. This could take the form of reflective diaries or blogs which FY1s keep themselves and use to reflect on what teaching they have done, what seemed to go well, and what they think are areas for improvement in their teaching.

The last word

Considerable care has been taken during the planning, data collection, analysis and write-up of this research to ensure that participant opinions and views were heard and appropriately represented. This has been challenging due to the number of voices and differing opinions on this somewhat controversial subject. Rather than trying to artificially combine or synthesise these, multiple voices from the literature and from research participants have been presented throughout this thesis. The 'new knowledge' that this thesis contributes to the literature can be seen to be pluralist, socially constructed, and also to an extent pragmatic. This research has identified and presented a diverse range of perspectives on what should be learned about teaching as part of the undergraduate medical curriculum. It did not seek to provide definitive answers on what should be learned, but rather to stimulate debate and stakeholder negotiations in this important area. This thesis contributes common reference points, tools and vocabulary to facilitate such negotiations, and to help undergraduate curriculum developers decide what are the most appropriate intended learning outcomes for their own curriculum, students and context. This thesis does not provide a definitive answer to the question '*What should my undergraduate medical students learn in relation to teaching?*', but it does provide a range of possible answers, will hopefully stimulate local debate on this question, and offers some tools to help curriculum developers explore local stakeholder views. It also offers multiple perspectives and 'voices' from the literature, from experts in medical education, trainees and students about what they think medical students should learn in relation to teaching. It is hoped that this thesis will help to provoke many more perspectives and voices to appear in the literature in relation to learning about teaching as part of the undergraduate medical curriculum, and that doctors of the future will not only be able to teach, but will also recognise that teaching as an important part of their role.

(this page is intentionally blank)

References

AGAR, M. H. 1980. *The professional stranger: an informal introduction to ethnography,* San Diego, California, Academic Press, Inc.

ÅKERLIND, G. S. 2007. Constraints on academics' potential for developing as a teacher. *Studies in Higher Education,* 32**,** 21-37.

ÅKERLIND, G. S. 2008. A phenomenographic approach to developing academics' understanding of the nature of teaching and learning. *Teaching in Higher Education,* 13**,** 633-644.

ALAHLAFI, A. & BURGE, S. 2005. What should undergraduate medical students know about psoriasis? Involving patients in curriculum development: modified Delphi technique. *British Medical Journal,* 330**,** 633-636.

ALLAN, J. 1996. Learning outcomes in higher education. *Studies in Higher Education,* 21**,** 93-108.

AME 2009. *Professional Standards,* London, Academy of Medical Educators.

AME. 2011. *Academy of Medical Educators* [Online]. Available: http://www.medicaleducators.org/ [Accessed Accessed: 20th February 2011.

AMEE, WFME, ASMSE & WHO-EURO 2005. *Statement on the Bologna process and medical education,* Copenhagen, Denmark, World Federation for Medical Education.

AMERICAL MEDICAL ASSOCIATION. 2011. *Requirements for becoming a physician* [Online]. Available: http://www.ama-assn.org/ama/pub/education-careers/becoming-physician.page [Accessed Accessed 27th September 2011.

AMRC 2009. *Common competences framework for doctors,* London, Academy of Medical Royal Colleges. Available: http://www.rcpe.ac.uk/training/files/ccfd-august-2009.pdf.

ANDERSON, L. W. & KRATHWOHL, D. R. 2001. *A taxonomy for learning, teaching and assessing: a revision of Bloom's taxonomy of educational objectives,* New York, Addison Wesley Longman.

ANDREATTA, P. B., HILLARD, M. L., MURPHY, M. A., GRUPPEN, L. G. & MULLAN, P. B. 2009. Short-term outcomes and long-term impact of a programme in medical education for medical students. *Medical Education,* 43**,** 260-267.

APTER, A., METZGER, R. & GLASSROTH, J. 1988. Residents' perceptions of their role as teachers. *Journal of Medical Education,* 63**,** 900-905.

ARETZ, H. T. 2011. Some thoughts about creating healthcare professionals that match what societies need. *Medical Teacher,* 33**,** 608-613.

ARGYRIS, C., PUTNAM, R. W. & MCLAIN-SMITH, D. 1985. *Action science: concepts, methods and skills for research and intervention,* Jossey-Bass, San Francisco.

ARGYRIS, C. & SCHÖN, D. A. 1974. *Theory in practice: increasing professional effectiveness,* Jossey Bass, San Francisco.

ARISTOTLE - TRANSLATED BY ROSS, W. D. 1980. *The nicomachean ethics,* Oxford, Oxford University Press (The World's Classics).

ARISTOTLE - TRANSLATED BY ROSS, W. D. 2000. *Aristotle's prior and posterior analytics: a revised text with introduction and commentary,* Oxford, Oxford University Press (Academic Monograph Reprints).

ASME 2005. Careers in medical education: report of the ASME conference held on 8 December 2005. Edinburgh: The Association for the Study of Medical Education.
ASPEGREN, K. 1999. BEME Guide No.2: Teaching and learning communication skills in medicine - a review with quality grading of articles. *Medical Teacher,* 21**,** 563-570.
ASSOCIATION OF AMERICAN MEDICAL COLLEGES 1998. Learning objectives for medical student education. Washington: AAMC.
ASSOCIATION OF AMERICAN MEDICAL COLLEGES 2007. *Advancing educators and education: defining the components of educational scholarship. Summary report and findings from the AAMC group on educational affairs consensus conference on educational scholarship.,* Washington, AAMC.
AVERY, A. J., SAVELYICH, B. S. P., SHEIKH, A., CANTRILL, J., MORRIS, C. J., FERNANDO, B., BAINBRIDGE, M., HORSFIELD, P. & TEASDALE, S. 2005. Identifying and establishing consensus on the most important safety features of GP computer systems: e-Delphi study. *Informatics in Primary Care,* 13**,** 3-11.
BANDARANAYAKE, R. C. 1985. How to plan a medical curriculum. *Medical Teacher,* 7**,** 7-13.
BARBOUR, R. S. 2005. Making sense of focus groups. *Medical Education,* 39**,** 742-750.
BARDACH, N. S., VEDANTHAN, R. & HABER, R. J. 2003. 'Teaching to Teach': enhancing fourth year medical students' teaching skills. *Medical Education,* 37**,** 1031-1032.
BARGH, J. A. & SCHUL, Y. 1980. On the cognitive benefits of teaching. *Journal of Educational Psychology,* 72**,** 593-604.
BARR, R. B. & TAGG, J. 1995. A new paradigm for undergraduate education. *Change,* November/December**,** 13-25. Online: http://ilte.ius.edu/pdf/BarrTagg.pdf.
BELL, H. L. 1996. *The journey of adulthood, 3rd Edition,* London, Printice-Hall International (UK) Limited.
BENNER, P. 1984. *From novice to expert: excellence and power in clinical nursing practice,* Menlo Park, California, Addison-Wesley Publishing Company.
BERA 2004. *Revised ethical guidelines for educational research,* Macclesfield, Cheshire, British Educational Research Association.
BERNE, E. 1964. *Games people play: the psychology of human relationships,* New York, Grove Press.
BHAREL, M. & JAIN, S. 2005. A longitudinal curriculum to improve resident teaching skills. *Medical Teacher,* 27**,** 564-566.
BIBB, C. A. & LEFEVER, K. H. 2002. Mentoring future dental educators through an apprentice teaching experience. *J Dent Educ.,* 66**,** 703-709.
BIGGS, J. B. 1996. Enhancing teaching through constructive alignment. *Higher Education,* 32**,** 347-364.
BIGGS, J. B. & TANG, T. S. 2009. *Teaching for quality learning at university, 3rd edition,* Maindenhead, Open University Press.
BING-YOU, R. G. & SPROUL, M. S. 1992. Medical students' perceptions of themselves and residents as teachers. *Medical Teacher,* 14**,** 133-138.
BLATT, B. & GREENBERG, L. 2007. A multi-level assessment of a program to teach medical students to teach. *Advances in Health Sciences Education,* 12**,** 7-18.

BLATT, B., GREENBERG, L., KALLENBERG, G., CONFESSORE, G. & CONFESSORE, S. 2000. *The TALKS manual: a guide to teaching senior students in the health professions to be educators,* Washington DC, George Washington University.

BLEAKLEY, A. 2002. Preregistration house officers and ward-based learning: a "new apprenticeship" model. *Medical Education,* 36**,** 9-15.

BLEAKLEY, A. & BRENNAN, N. 2011. Does undergraduate curriculum design make a difference to readiness to practice as a junior doctor? *Medical Teacher,* 33**,** 459-467.

BLOOM, B. S., ENGELHART, M. D., FURST, E. J., HILL, W. H. & KRATHWOHL, D. R. 1956. *Taxonomy of educational objectives: the classification of educational goals. Handbook I: cognitive domain,* New York, Longmans Green.

BMA-MSC 2005. Medicine in the 21st century - standards for the delivery of undergraduate medical education. London: British Medical Association - Medical Students Committee.

BOLANDER LAKSOV, K., LONKA, K. & JOSEPHSON, A. 2008. How do medical teachers address the problem of transfer? *Advances in Health Sciences Education,* 13**,** 345-360.

BOSHIER, R. & HUANG, Y. 2008. In the house of scholarship of teaching and learning (SoTL), teaching lives upstairs and learning in the basement. *Teaching in Higher Education,* 13**,** 645-656.

BOULET, J., BEDE, C., MCKINLEY, D. & NORCINI, J. 2007. An overview of the world's medical schools. *Medical Teacher,* 29**,** 20-26.

BOYER, E. L. 1990. *Scholarship reconsidered: priorities of the professoriate,* Princeton, New Jersey, The Carnegie Foundation for the Advancement of Teaching (Special Report).

BRAUN, V. & CLARKE, V. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology,* 3**,** 77-101.

BREW, A. 2003. Teaching and research: new relationships and their implications for inquiry-based teaching and learning in higher education. *Higher Education Research and Development,* 22**,** 3-18.

BRICE, J. & CORRIGAN, O. 2010. The changing landscape of medical education in the UK. *Medical Teacher,* 32**,** 727-732.

BRUNER, J. 1960. *The process of education,* New York, Random House.

BUCKLEY, S. & ZAMORA, J. 2007. Effects of participation in a cross year peer tutoring programme in clinical examination skills on volunteer tutors' skills and attitudes towards teachers and teaching. *BMC Medical Education,* 7**,** 20.

BULIK, R. J. & SHOKAR, G. S. 2007. "Coming about!" - a faculty workshop on teaching beliefs. *Teaching and Learning in Medicine,* 19**,** 168-173.

BULTE, C., BETTS, A., GARNER, K. & DURNING, S. 2007. Student teaching: views of student near-peer teachers and learners. *Medical Teacher,* 29**,** 583-590.

BUNNISS, S. & KELLY, D. R. 2010. Research paradigms in medical education research. *Medical Education,* 44**,** 358-366.

BURKE, S., MARTYN, M., STONE, A., BENNETT, C., THOMAS, H. & FARNDON, P. 2009. Developing a curriculum statement based on clinical practice: genetics in primary care. *British Journal of General Practice,* , February 2009**,** 99-103.

BUSARI, J. O., PRINCE, K. J. A. H., SCHERPBIER, A. J. J. A., VAN DER VLEUTEN, C. P. M. & ESSED, G. G. M. 2002. How residents perceive their teaching role in the clinical setting: a qualitative study. *Medical Teacher,* 24**,** 57-61.

BUSARI, J. O., SCHERPBIER, A. J. J. A., VAN DER VLEUTEN, C. P. M. & ESSED, G. E. 2000. Residents' perception of their role in teaching undergraduate students in the clinical setting. *Medical Teacher,* 22**,** 348-353.

BUSARI, J. O., SCHERPBIER, A. J. J. A., VAN DER VLEUTEN, C. P. M. & ESSED, G. G. M. 2003. The perceptions of attending doctors on the role of residents as teachers of undergraduate clinical students. *Medical Education,* 37**,** 241-247.

CACCIOTTOLO, J. 2009. *University of Malta, Faculty of Medicine and Surgery. Draft document for general consultation: development of learning outcomes and competency framework for the MD degree.* [Online]. Available: http://www.um.edu.mt/ms/notices/?a=77231.

CALMAN, K. C. 2007. *Medical education: past, present and future,* Edinburgh, Elsevier.

CAMERON, H. S. & ROSS, M. T. 2008. MBChB Teacher Training 2006-8. QUABME school evidence submission, supplement 2f. Edinburgh: The University of Edinburgh.

CARNELL, E. 2007. Conceptions of effective teaching in higher education: extending the boundaries. *Teaching in Higher Education,* 12**,** 25-40.

CARR, D. 2000. *Professionalism and ethics in teaching,* London, Routledge.

CARR, D. & KEMMIS, S. 1986. *Becoming critical: education, knowledge and action research,* London, Falmer Press.

CAVE, J., GOLDACRE, M., LAMBERT, T., WOOLF, K., JONES, A. & DACRE, J. 2007. Newly qualified doctors' views about whether their medical school had trained them well: questionnaire surveys. *BMC Medical Education,* 7**,** 38.

CENTENO, A. M., BLANCO, M. A. & CAMPOS, S. 2001. A program for peer teachers in undergraduate medical education. *Academic Medicine,* 76**,** 576.

CHARMAZ, K. 2006. *Constructing grounded theory: a practical guide through qualitative analysis,* London, SAGE Publications Ltd.

CHARME WEBSITE. 2011. *Challenges of Harmonising Medical Education in Europe* [Online]. Available: http://www.charite.de/charme/ [Accessed Accessed 18th September 2011.

CHOU, C. L. 2005. Physical examination teaching curriculum for senior medical students. *Medical Education,* 39**,** 1151.

CHRISTENSEN, L. 2004. The Bologna Process and medical education. *Medical Teacher,* 26**,** 625-629.

CHRISTENSEN, L., KARLE, H. & NYSTRUP, J. 2007. Process-outcome interrelationship and standard setting in medical education: the need for a comprehensive approach. *Medical Teacher,* 29**,** 672-677.

CLAYTON, M. J. 1997. Delphi: a technique to harness expert opinion for critical decision-making tasks in education. *Educational Psychology,* 17**,** 373-386.

COBURN, D. & WILLIS, E. 1999. The medical profession: knowledge, power and autonomy. *In:* ALBRECHT, G. L., FITZPATRICK, R. & SCRIMSHAW, S. C. (eds.) *In: Handbook of Social Studies in Health and Medicine.* London: Sage Publications Limited.

COHEN, L., MANION, L. & MORRISON, K. 2007. *Research methods in education, 6th edition,* Abingdon, Oxon, Routledge.

COHEN, R., MURNAGHAN, L., COLLINS, J. & PRATT, D. 2005. An update on master's degrees in medical education. *Medical Teacher,* 27**,** 686-692.
COHEN, S. & DENNICK, R. 2009. Applying learning theory in the consultation. *The Clinical Teacher,* 6**,** 117-121.
CRAIG, J. L. & PAGE, G. 1987. Teaching in medicine: an elective course for third-year students. *Medical Education,* 21**,** 386-390.
CRANTON, P. 2002. Teaching for transformation. *New Directions for Adult and Continuing Education,* 93**,** 63-71.
CRANTON, P. & CARUSETTA, E. 2004. Perspectives on authenticity in teaching. *Adult Education Quarterly,* 55**,** 5-22.
CRENSHAW, K., SHEWCHUK, R. M., QU, H., STATON, L. J., BIGBY, J. A., HOUSTON, T. K., ALLISON, J. & ESTRADA, C. A. 2011. What should we include in a cultural competence curriculum? An emerging formative evaluation process to foster curriculum development. *Academic Medicine,* 86**,** 333-341.
CRESSWELL, J. W. 1998. *Qualitative inquiry and research design: choosing among five traditions,* London, SAGE Publications.
CRESSWELL, J. W. 2003. *Research design: qualitative, quantitative and mixed methods approaches,* London, SAGE Publications.
CREUSY, C., TENORE, A., CUMMING, A. D., ROSS, M. T., KISS, C., VEREB, G., COSTIGLIOLA, V., BREIPOHL, W., KALACH, N. & VAINIO, O. 2011. EUROPET: A European initiative at harmonizing the training of physicians that will care for children and adolescents. *European Journal of Paediatrics,* (in press).
CRUESS, S. R., CRUESS, R. L. & STEINERT, Y. 2008. Role modelling - making the most of a powerful teaching strategy. *British Medical Journal,* 336**,** 718-721.
CUMMING, A. D. 2010. The Bologna process, medical education and integrated learning. *Medical Teacher,* 32**,** 316-318.
CUMMING, A. D. & ROSS, M. T. 2007a. Tuning educational structures in Europe: subject area brochure medicine. Edinburgh: The University of Edinburgh.
CUMMING, A. D. & ROSS, M. T. 2007b. The Tuning Project for medicine – learning outcomes for undergraduate medical education in Europe. *Medical Teacher,* 29**,** 636-641.
CUMMING, A. D. & ROSS, M. T. 2008. The Tuning Project (medicine) – learning outcomes / competences for undergraduate medical education in Europe. Edinburgh: The University of Edinburgh. Available online: http://www.tuning-medicine.com. Accessed 23rd April 2012.
CUSIMANO, M. D. & DAVID, M. A. 1998. A compendium of higher education opportunities in health professions education. *Academic Medicine,* 73**,** 1255-1259.
D'EON, M. & CRAWFORD, R. 2005. The elusive content of the medical-school curriculum: a method to the madness. *Medical Teacher,* 27**,** 699-703.
DALKEY, N. & HELMER, O. 1963. An experimental application of the Delphi method to the use of experts. *Management Science,* 9**,** 458-467.
DALL'ALBA, G. 2004. Understanding professional practice: investigations before and after an educational programme. *Studies in Higher Education,* 29**,** 679-692.
DALL'ALBA, G. & BARNACLE, R. 2007. An ontological turn for higher education. *Studies in Higher Education,* 32**,** 679-691.

DANDAVINO, M., SNELL, L. & WISEMAN, J. 2007. Why medical students should learn how to teach. *Medical Teacher,* 29**,** 558-565.
DASGUPTA, S., FORNARI, A., GEER, K., HAHN, L., KUMAR, V., LEE, H. J., RUBIN, S. & GOLD, M. 2006. Medical education for social justice: Paulo Freire revisited. *Journal of Medical Humanities,* 27.
DAVIS, M., AMIN, Z., GRANDE, J. P., O'NEILL, A. E., PAWLINA, W., VIGGIANO, T. R. & ZUBERI, R. 2007. Case studies in outcome-based education. *Medical Teacher,* 29**,** 717-722.
DE BERE, S. R. & MATTICK, K. 2010. From anatomical 'competence' to complex capability. The views and experiences of UK tutors on how we should teach anatomy to medical students. *Advances in Health Sciences Education,* 15**,** 573-585.
DE VILLIERS, M. R., DE VILLIERS, P. J. T. & KENT, A. P. 2005. The Delphi technique in health sciences education research. *Medical Teacher,* 27**,** 639-643.
DEEM, R. 1998. 'New managerialism' and higher education: the management of performances and cultures in universities in the United Kingdom. *International Studies in Sociology of Education,* 8**,** 47-70.
DEGGS, D. M., MACHTMES, K. L. & JOHNSON, E. 2008. The significance of teaching perspectives among academic disciplines. *College Teaching Methods and Styles Journal,* 4**,** 1-7.
DENZIN, N. K. & LINCOLN, Y. S. 2005. *The SAGE handbook of qualitative research, 3rd edition,* Thousand Oaks, California, SAGE Publications, Inc.
DEVLIN, M. 2006. Challenging accepted wisdom about the place of conceptions of teaching in university teaching improvement. *international Journal of Teaching and Learning in Higher Education,* 18**,** 112-119.
DICICCO-BLOOM, B. & CRABTREE, B. F. 2006. The qualitative research interview. *Medical Education,* 40**,** 314-321.
DICK, B. & DALMAU, T. 1990. *Values in action: applying the ideas of Argyris and Schön,* Brisbane, Interchange.
DOH, COUNCIL, H. P., UK, U., GMC & COUNCIL, N. M. 2003. Statement of guiding principles relating to the commissioning and provision of communication skills training in pre-registration and undergraduate education for healthcare professionals. London: Department of Health.
DORNAN, T. 2010. On complexity and craftsmanship. *Medical Education,* 44**,** 2-3.
DUNN, W. R., HAMILTON, D. D. & HARDEN, R. M. 1985. Techniques for identifying competencies needed of doctors. *Medical Teacher,* 7**,** 15-25.
DUNNE, J. 1993. *Back to the rough ground: 'phronesis' and 'techne' in modern philosophy and in Aristotle,* Notre Dame, Indiana USA, University of Notre Dame Press.
DURNING, S. J. & ARTINO, A. R. 2011. Situativity theory: a perspective on how participants and the environment can interact. AMEE Guide no. 52. *Medical Teacher,* 33**,** 188-199.
EHEA WEBSITE. 2011. *European Higher Education Area* [Online]. Available: http://www.ehea.info [Accessed Accessed 18th September 2011.
ELIZONDO-MONTEMAYOR, L., CID-GARCÍA, A., PÉREZ-RODRÍGUEZ, B. A., ALARCÓN-FUENTES, G., PÉREZ-GARCÍA, I. & STERN, D. T. 2007. Outcome-based national profile of Mexico's medical graduates. *Medical Teacher,* 29**,** 691-698.

ELLAWAY, R., DEWHURST, D. & CUMMING, A. D. 2003. Managing and supporting medical education with a virtual learning environment: the Edinburgh Electronic Medical Curriculum. *Medical Teacher,* 25**,** 372-380.
ELLAWAY, R., EVANS, P., MCKILLOP, J., CAMERON, H. S., MORRISON, J., MCKENZIE, H., MIRES, G., PIPPARD, M., SIMPSON, J., CUMMING, A. D., HARDEN, R. & GUILD, S. 2007. Cross-referencing the Scottish Doctor and Tomorrow's Doctors outcome frameworks. *Medical Teacher,* 29**,** 630-635.
ELLAWAY, R. E., CAMERON, H. S., ROSS, M. T., WITH CONTRIBUTIONS FROM LAURIE, G., MAXWELL, M. & PRATT, R. 2006. Clinical recordings for academic non-clinical settings: CHERRI project report. Edinburgh: The University of Edinburgh. Online http://www.cherri.mvm.ed.ac.uk.
ELNICKI, D. M., OGDEN, P. & WU, E. 2007. Medical student abuse from multiple perspectives. *The Clinical Teacher,* 4**,** 153-158.
ENTWISTLE, N. J. 1988. *Styles of learning and teaching: an integrated outline of educational psychology for students, teachers and lecturers,* London, David Fulton Publishers Ltd.
ERAUT, M. 1994. *Developing professional knowledge and competence,* London, The Falmer Press.
ERICSSON, K. A. 2004. Deliberate practice and the acquisition and maintenance of expert performance in medicine and related domains. *Academic Medicine,* 79**,** S70-S81.
ERICSSON, K. A., KRAMPE, R. T. & C., T.-R. 1993. The role of deliberate practice in the acquisition of expert performance. *Psychological Review,* 100**,** 363-406.
ESMAILY, H. M., SAVAGE, C., VAHIDI, R., AMINI, A., ZARRINTAN, M. H. & WAHLSTROM, R. 2008. Identifying outcome-based indicators and developing a curriculum for a continuing medical education programme on rational prescribing using a modified Delphi process. *BMC Medical Education,* 8**,** 33.
EU 2005. European Parliament and Council Directive 2005/36/EC of 7 September 2005 on the recognition of professional qualifications.: Online: http://europa.eu/scadplus/leg/en/cha/c11065.html.
EUROPEAN COMMISSION 2009. *EAC/40/2009 - Feasibility study on the relevance of a Tuning approach in higher education in Africa,* Brussels, European Commission.
EUROPEAN MINISTERS OF EDUCATION 1999. Joint declaration of the European Ministers of Education convened in Bologna on the 19th June 1999 [The Bologna Declaration]. Online: http://www.dfes.gov.uk/bologna/uploads/documents/BOLOGNA_DECLARATION1.pdf.
EUROPET WEBSITE. 2008. *European Paediatrics Thematic Network* [Online]. Available: http://www.europet.org [Accessed accessed 5th May 2008.
EVANS, D. E., ALSTEAD, E. M. & BROWN, J. 2010. Applying your clinical skills to students and trainees in academic difficulty. *The Clinical Teacher,* 7**,** 230-235.
EVANS, D. E. & ROBERTS, M. 2006. Preparation for practice: how can medical schools better prepare PRHOs? *Medical Teacher,* 28**,** 549-552.
FANGHANEL, J. 2007. Investigating university lecturers' pedagogical constructs in the working context. Report on research funded by The Higher Education Academy. Online:

http://www.heacademy.ac.uk/assets/York/documents/ourwork/research/fanghanel.pdf
FANGHANEL, J. 2009. The role of ideology in shaping academics' conceptions of their discipline. *Teaching in Higher Education,* 14**,** 565-577.
FAUNCE, T. A. & GATENBY, P. 2005. Flexner's ethical oversight reprised? Contemporary medical education and the health impacts of corporate globalisation. *Medical Education,* 39**,** 1066-1074.
FEINBERG, J. 2011. *Wordle* [Online]. Available: http://www.wordle.net/ [Accessed Accessed 29th March 2011.
FERGUSSON, R. 2000. Modernizing managerialism in education. *In:* CLARKE, J., GEWIRTZ, S. & MCLAUGHLIN, E. (eds.) *New managerialism, new welfare?* London: The Open University.
FIELDING, J. & GILBERT, N. 2006. *Understanding social statistics, 2nd edition,* London, SAGE Publications Ltd.
FINCHER, R.-M. E., SIMPSON, D. E., MENNIN, S. P., ROSENFELD, G. C., ROTHMAN, A., MCGREW, M. C., HANSEN, P. A., MAZMANIAN, P. E. & TURNBULL, J. M. 2000. Scholarship in teaching: an imperative for the 21st Century. *Academic Medicine,* 75**,** 887-894.
FORREST, K., COOPER, N. & BELFIELD, P. 2006. Introducing foundation programmes. *The Clinical Teacher,* 3**,** 238-241.
FOX, D. 2006. Personal theories of teaching. *Studies in Higher Education,* 8**,** 151-163.
FRANK, J. R. 2005. The CanMEDS 2005 physician competency framework. Better standards. Better physicians. Better care. Ottowa: The Royal College of Physicians and Surgeons of Canada.
FRANK, J. R. & DANOFF, D. 2007. The CanMEDS initiative: implementing an outcomes-based framework of physician competencies. *Medical Teacher,* 29**,** 642-647.
FRANK, J. R., MUNGROO, R., AHMAD, Y., WANG, M., DE ROSSI, S. & HORSLEY, T. 2010a. Toward a definition of competency-based education in medicine: a systematic review of published definitions. *Medical Teacher,* 32**,** 631-637.
FRANK, J. R., SNELL, L. S., TEN CATE, O., HOLMBOE, E. S., CARRACCIO, C., SWING, S. R., HARRIS, P., GLASGOW, N. J., CAMPBELL, C., DATH, D., HARDEN, R. M., IOBST, W., LONG, D. M., MUNGROO, R., RICHARDSON, D. L., SHERBINO, J., SILVER, I., TABER, S., TALBOT, M. & HARRIS, K. A. 2010b. Competency-based medical education: theory to practice. *Medical Teacher,* 32**,** 638-645.
FRASER, S. W. & GREENHALGH, T. 2001. Coping with complexity: educating for capability. *British Medical Journal,* 323**,** 799-803.
FREIRE, P. 1972. *Pedagogy of the oppressed,* London, Pelican.
FSMB AND NBME. 2011. *United States Medical Licensing Examination (USMLE) website. Federation of State Medical Boards and National Board of Medical Examiners* [Online]. Available: http://www.usmle.org
GARNER, L. 1979. Doctor power. *In: The NHS: your money or your life.* Harmnondsworth, Middlesex: Penguin Books Ltd.
GIBBS, G. & COFFEY, M. 2009. The impact of university teachers on their teaching skills, their approach to teaching and the approach to learning of their students. *Active Learning in Higher Education,* 5**,** 87-100.

GILL, D. & GRIFFIN, A. 2010. Good medical practice: what are we trying to say? Textual analysis using tag clouds. *Medical Education,* 44**,** 316-322.
GLASER, B. & STRAUSS, A. 1967. The discovery of grounded theory. Chicago: Aldine.
GLASSIC, C. E. 2000. Boyer's expanded definition of scholarship, the standards for assessing scholarship, and the elusiveness of the scholarship of teaching. *Academic Medicine,* 75**,** 877-880.
GMC 1999. *The doctor as teacher,* London, General Medical Council.
GMC 2003. *Tomorrow's doctors: recommendations on undergraduate medical education.,* London, General Medical Council.
GMC 2006. *Good medical practice,* London, General Medical Council.
GMC. 2008. *Quality Assurance of Basic Medical Education - Report on University of Edinburgh College of Medicine and Veterinary Medicine* [Online]. Available: http://www.gmc-uk.org/static/documents/content/Edinburgh.pdf [Accessed Accessed: 21st April 2011.
GMC 2009a. *The new doctor,* London, General Medical Council.
GMC 2009b. *Tomorrow's Doctors: outcomes and standards for undergraduate medical education,* London, General Medical Council.
GMC. 2010a. *General Medical Council - Approved Curricula Systems* [Online]. Available: http://www.gmc-uk.org/education/postgraduate/approved_curricula_systems.asp [Accessed Accessed 8/6/10.
GMC. 2010b. *General Medical Council - Education and training* [Online]. Available: http://www.gmc-uk.org/education/ [Accessed Accessed 29th April 2011.
GMC. 2010c. *General Medical Council - Interactive case studies* [Online]. Available: http://www.gmc-uk.org/guidance/case_studies.asp [Accessed Accessed 8/7/10.
GMC 2010d. *Generic standards for speciality including GP training,* London, The General Medical Council.
GMC 2010e. *Medical students: professional values and fitness to practise,* London, The General Medical Council.
GMC 2010f. *Standards for curricula and assessment systems,* London, The General Medical Council.
GMC 2010g. *Standards for deaneries,* London, General Medical Council.
GMC. 2011a. *Approval: post and programme* [Online]. Available: http://www.gmc-uk.org/education/postgraduate/approval_post_and_programme.asp [Accessed Accessed: 20th February 2011.
GMC. 2011b. *Assuring Quality in Medical Education* [Online]. Available: http://www.gmc-uk.org/education/assuring_quality.asp [Accessed 21st April 2011.
GMC. 2011c. *Bodies awarding UK medical degrees* [Online]. Available: http://www.gmc-uk.org/education/undergraduate/awarding_bodies.asp [Accessed Last accessed 29th April 2011.
GMC 2011d. *Developing teachers and trainers in undergraduate medical education: advice supplementary to Tomorrow's Doctors (2009),* London, The General Medical Council.
GMC. 2011e. *The Medical Register* [Online]. Available: http://www.gmc-uk.org/doctors/medical_register.asp [Accessed Accessed: 18th September 2011.

GMC. 2011f. *Revalidation* [Online]. Available: http://www.gmc-uk.org/doctors/7330.asp [Accessed 20th February 2011.
GMC 2011g. *The trainee doctor,* London, The General Medical Council.
GMC. 2011h. *UK medical schools - full list of quality assurance reports* [Online]. Available: http://www.gmc-uk.org/education/medical_school_reports_full_list.asp [Accessed Last accessed 29th April 2011.
GOGUEN, J., KNIGHT, M. & TIBERIUS, R. 2008. Is it science? A study of the attitudes of medical trainees and physicians toward qualitative and quantitative research. *Advances in Health Sciences Education,* 13**,** 659-674.
GOLEMAN, D. 1996. *Emotional intelligence: why it can matter more than IQ,* London, Bloomsbury Publishing Plc.
GONZALEZ, J., WAGENAAR, R. & (EDS) 2003. *Tuning educational structures in Europe: final report phase 1,* Bilbao, Spain, Universidad de Deusto.
GONZALEZ, J., WAGENAAR, R. & (EDS) 2005. *Tuning educational structures in Europe II: Universities' contribution to the Bologna process,* Bilbao, Spain, Universidad de Deusto.
GOUGH, J. & BECKETT, D. 2006. Young doctors as teachers: understanding their motivations and needs. *The Clinical Teacher,* 3**,** 49-52.
GREENHALGH, T. 1999. Narrative based medicine: narrative based medicine in an evidence based world. *British Medical Journal,* 318**,** 323-325.
GRIEVE, J., CRUICKSHANK, M. & CLELAND, J. 2009. Using a consensus method to develop labour ward learning objectives. *The Clinical Teacher,* 6**,** 186-189.
GUBA, E. G. & LINCOLN, Y. S. 2005. Paradigmatic controversies, contradictions, and emerging confluences. *In:* DENZIN, N. K. & LINCOLN, Y. S. (eds.) *The SAGE handbook of qualitative research, 3rd edition.* Thousand Oaks, California: SAGE Publications, Inc.
HAIG, A. & DOZIER, M. 2003. BEME Guide No 3: Best Evidence Medical Education: Systematic searching for evidence in medical education (parts 1&2). *Medical Teacher,* 25**,** 352-363; 463-484.
HAMILTON, J. D. 1999. Outcomes in medical education must be wide, long and deep. *Medical Teacher,* 21**,** 125-126.
HAMMICK, M., DORNAN, T. & STEINERT, Y. 2010. Conducting a best evidence systematic review. Part 1: from idea to data coding. BEME Guide No.13. *Medical Teacher,* 32**,** 3-15.
HAMMICK, M. & HAIG, A. 2007. The Best Evidence Medical Education collaboration: processes, products and principles. *The Clinical Teacher,* 4**,** 42-45.
HARDEN, R. 2002a. Developments in outcome-based education. *Medical Teacher,* 24.
HARDEN, R. 2002b. Learning outcomes and instructional objectives: is there a difference? *Medical Teacher,* 24**,** 151-155.
HARDEN, R. M. 1986. ASME Booklet 21: Approaches to curriculum planning. *Medical Education,* 20**,** 458-466.
HARDEN, R. M. 2001. AMEE guide no. 21: curriculum mapping: a tool for transparent and authentic teaching and learning. *Medical Teacher,* 23**,** 123-137.
HARDEN, R. M. 2007a. Learning outcomes as a tool to assess progression. *Medical Teacher,* 29**,** 678-682.

HARDEN, R. M. 2007b. Outcome-based education - the ostrich, the peacock and the beaver. *Medical Teacher,* 29**,** 666-671.
HARDEN, R. M. 2007c. Outcome-based education: the future is today. *Medical Teacher,* 29**,** 625-629.
HARDEN, R. M. & CROSBY, J. R. 2000. AMEE Guide No. 20: The good teacher is more than a lecturer: the twelve roles of the teacher. *Medical Teacher,* 22**,** 334-347.
HARDEN, R. M., CROSBY, J. R. & DAVIS, M. H. 1999a. AMEE Guide No. 14: Outcome-based education: Part 1 - An introduction to outcome-based education. *Medical Teacher,* 21**,** 7-14.
HARDEN, R. M., CROSBY, J. R. & DAVIS, M. H. 1999b. An introduction to outcome-based education. *Medical Teacher,* 21**,** 7-14.
HARDEN, R. M. & DAVIS, M. 1995. The core curriculum with options or special study modules. *Medical Teacher,* 17**,** 125-148.
HARDEN, R. M., SOWDEN, S. & DUNN, W. R. 1984. ASME Booklet 18: Educational strategies in curriculum development: the SPICES model. *Medical Education,* 18**,** 284-297.
HARDEN, R. M. & STAMPER, N. 1999. What is a spiral curriculum? *Medical Teacher,* 21**,** 141-143.
HARMS AMOROSA, J. M., MELLMAN, L. A. & GRAHAM, M. J. 2011. Medical students as teachers: how preclinical teaching opportunities can create an early awareness of the role of physician as teacher. *Medical Teacher,* 33**,** 137-144.
HARRIS, D. L., KRAUSE, K., PARISH, D. & SMITH, M. 2007. Academic competencies for medical faculty. *Family Medicine,* 39**,** 343-350.
HARRIS, K. R. & ALEXANDER, P. A. 1998. Integrated, constructivist education: challenge and reality. *Educational Psychology Review,* 10**,** 115-127.
HARRIS, P., SNELL, L., TALBOT, M. & HARDEN, R. M. 2010. Competency-based medical education: implications for undergraduate programs. *Medical Teacher,* 32**,** 646-650.
HEA 2006. *The UK Professional Standards Framework for teaching and supporting learning in higher education,* York, Higher Education Academy.
HESKETH, E. A., BAGNALL, G., BUCKLEY, E. G., FRIEDMAN, M., GOODALL, E., HARDEN, R. M., LAIDLAW, J. M., LEIGHTON-BECK, L., MCKINLAY, P., NEWTON, R. & OUGHTON, R. 2001. A framework for developing excellence as a clinical educator. *Medical Education,* 35**,** 555-564.
HIGGS, J. & MCALLISTER, L. 2007. Being a clinical educator. *Advances in Health Sciences Education,* 12**,** 187-99.
HIGHET, G. 1950. *The art of teaching*, Alfred A. Knopf, Inc.
HILGERS, J. & DE ROOS, P. 2007. European Core Curriculum-the Students' Perspective, Bristol, UK, 10 July 2006. *Medical Teacher,* 29**,** 270-275.
HILL, A. G., YU, T. C., BARROW, M. & HATTIE, J. 2009. A systematic review of resident-as-teacher programmes. *Medical Education,* 43**,** 1129-1140.
HO, A., WATKINS, D. & KELLY, M. 2001. The conceptual change approach to improving teaching and learning: an evaluation of a Hong Kong staff development programme. *Higher Education,* 42**,** 143-169.
HOAT, L. N., YEN, N. B. & WRIGHT, E. P. 2007. Participatory identification of learning objectives in eight medical schools in Vietnam. *Medical Teacher,* 29**,** 683-690.

HOUNSELL, D. 1984. Understanding teaching and teaching for understanding. *In:* MARTON, F., HOUNSELL, D. & ENTWISTLE, N. (eds.) *The experience of learning*. Edinburgh: Scottish Academic Press.
HOWE, A., KEOGH-BROWN, M., MILES, S. & BACHMANN, M. 2007. Expert consensus on contamination in educational trials elicited by a Delphi exercise. *Medical Education,* 41**,** 196-204.
HUBBALL, H., GOLD, N., MIGHTY, J. & BRITNELL, J. 2007. Supporting the implementation of externally generated learning outcomes and learning-centered curriculum development: an integrated framework. *New Directions for Teaching and Learning,* 112**,** 93-105.
HUSSEY, T. & SMITH, P. 2002. The trouble with learning outcomes. *Active Learning in Higher Education,* 3**,** 220-233.
HUSSEY, T. & SMITH, P. 2003. The uses of learning outcomes. *Teaching in Higher Education,* 8**,** 357-368.
IRVINE, D. H. 2006. A short history of the General Medical Council. *Medical Education,* 40**,** 202-211.
ISCP. 2010. *Curriclulum Overview* [Online]. London: Intercollegiate Surgical Curriculum Programme. Available: Online: http://www.iscp.ac.uk [Accessed 20th February 2012.
JAMES, M. T., MINTZ, M. J. & MCLAUGHLIN, K. 2006. Evaluation of a multifaceted "resident-as-teacher- educational intervention to improve morning report. *BMC Medical Education,* 6**,** 20.
JAMIESON, S. 2004. Likert scales: how to (ab)use them. *Medical Education,* 38**,** 1217-1218.
JARVIS-SELINGER, S., COLLINS, J. B. & PRATT, D. D. 2006. Do academic origins influence perspectives on teaching? *Teacher Education Quarterly,* 34**,** 67-82.
JOINT QUALITY INITIATIVE 2004. Shared 'Dublin' descriptors for Short Cycle, First Cycle, Second Cycle and Third Cycle awards. Online: http://www.jointquality.nl/content/descriptors/CompletesetDublinDescriptors.doc.
JONES, A., MCARDLE, P. J. & O'NEILL, P. A. 2002. Perceptions of how well graduates are prepared for the role of pre-registration house officer: a comparison of outcomes from a traditional and an integrated PBL curriculum. *Medical Education,* 36**,** 16-25.
JONES, R. & OSWALD, N. 2001. A continuous curriculum for general practice? Proposals for undergraduate-postgraduate collaboration. *British Journal of General Practice, ,* February 2001**,** 135-137.
JONES, W. S., HANSON, J. L. & LONGACRE, J. L. 2004. An intentional modeling process to teach professional behavior: students' clinical observations of preceptors. *Teaching and Learning in Medicine,* 16**,** 264-269.
KANE, R., SANDRETTO, S. & HEATH, C. 2002. Telling half the story: a critical review of research on the teaching beliefs and practices of university academics. *Review of Educational Research,* 72**,** 177-228.
KEMBER, D. 1997. A reconceptualisation of the research into university academics' conceptions of teaching. *Learning and Instruction,* 7**,** 255-275.
KEMBER, D. & KWAN, K. P. 2000. Lecturers' approaches to teaching and their relationship to conceptions of good teaching. *Instructional Science,* 28**,** 469-490.

KEMERLING, G. 2010. *The Dictionary of Philosophical Terms and Names* [Online]. Available: http://www.philosophypages.com [Accessed Accessed 23rd April 2010.
KENNEDY, I. 2001. *Learning from Bristol: the report of the public inquiry into children's heart surgery at the Bristol Royal Infirmary 1984-1995,* London, HMSO. Online: http://www.bristol-inquiry.org.uk/final_report/the_report.pdf.
KNOWLES, M. S. 1968. Andragogy, not pedagogy. *Adult Leadership,* 16**,** 350-352.
KNOWLES, M. S., HOLTON, E. F. & SWANSON, R. A. 2011. *The adult learner: the definitive classic in adult education and human resource development, 7th edition,* London, Elsevier.
KOCH, T. 1994. Establishing rigour in qualitative research: the decision trail. *Journal of Advanced Nursing,* 19**,** 976-986.
KOENS, F., RADEMAKERS, J. & TEN CATE, O. 2005. Validation of core medical knowledge by postgraduates and specialists. *Medical Education,* 39**,** 911-917.
KOLB, D. A. 1984. *Experiential learning. Experience as the source of learning and development,* New Jersey, Prentice-Hall.
KORTHAGEN, F. A. J., KESSELS, J., KOSTER, B., LAGERWERF, B. & WUBBELS, T. 2001. *Linking practice and theory: the pedagogy of realistic teacher education,* Mahwah, New Jersey, Lawrence Erlbaum Associates Inc. Reprinted 2008, New York: Routledge.
KRATHWOHL, D. R., BLOOM, B. S. & MASIA, B. B. 1956. *Taxonomy of educational objectives: the classification of educational goals. Handbook II: affective domain,* New York, David McKay Company, Inc.
KREBER, C. 2001. Conceptualizing the scholarship of teaching and identifying unresolved issues: the framework for this volume. *New Directions for Teaching and Learning,* 86**,** 1-18.
KREBER, C. 2002. Controversy and consensus on the scholarship of teaching. *Studies in Higher Education,* 27**,** 151-167.
KREBER, C. 2010. Academics' teacher identities, authenticity and pedagogy. *Studies in Higher Education,* 35**,** 171-194.
KREBER, C., MCCUNE, V. & KLAMPFLEITNER, M. 2010. Formal and implicit conceptions of authenticity in teaching. *Teaching in Higher Education,* 15**,** 383-397.
KUGEL, P. 1993. How professors develop as teachers. *Studies in Higher Education,* 18**,** 315-328.
KUHN, T. S. 1962. *The structure of scientific revolutions,* Chicago, University of Chicago.
LAIDLAW, J. M. & HARDEN, R. M. 1995. Needs assessment and the development of an educational programme on malignant melanoma for general practitioners. *Medical Teacher,* 17**,** 79-87.
LARSSON, S. 2009. A pluralist view of generalization in qualitative research. *International Journal of Research and Method in Education,* 32**,** 25-38.
LAVE, J. & WENGER, E. 1991. *Situated learning: legitimate peripheral participation,* Cambridge, Cambridge University Press.
LEUNG, W. C. 2002. Competency based medical training: review. *British Medical Journal,* 325**,** 693-696.
LINCOLN, Y. S. & GUBA, E. G. 1985. *Naturalistic enquiry,* Thousand Oaks, CA, SAGE.
LOWRY, S. 1992. Curriculum design. *British Medical Journal,* 305**,** 1409-1411.

LUFT, J. & INGHAM, H. 1955. *The Johari window, a graphic model of interpersonal awareness. Proceedings of the Western training laboratory in group development,* Los Angeles, UCLA.
MACSUIBHNE, S. P. 2010. Sophistry, the Sophists and modern medical education. *Medical Teacher,* 32**,** 71-75.
MAGUIRE, P. & PITCEATHLY, C. 2002. Key communication skills and how to acquire them. *British Medical Journal,* 325**,** 697-700.
MANN, K. V., SUTTON, E. & FRANK, B. 2007. Twelve tips for preparing residents as teachers. *Medical Teacher,* 29**,** 301-306.
MARTIN, E., PROSSER, M., TRIGWELL, K., RAMSDEN, P. & BENJAMIN, J. 2000. What university teachers teach and how they teach it. *Instructional Science,* 28**,** 387-412.
MARTON, F., HOUNSELL, D. & ENTWISTLE, N. J. 1984. *The experience of learning,* Edinburgh, Scottish Academic Press.
MARTON, F. & SÄLJÖ, R. 1976. On qualitative differences in learning: 1 - outcome and process. *British Journal of Educational Psychology,* 46**,** 4-11.
MAUDSLEY, G. 2011. Mixing it but not mixed-up: mixed methods research in medical education (a critical narrative review). *Medical Teacher,* 33**,** e92-e104.
MCAVOY, B. R. 1985. How to choose and use educational objectives. *Medical Teacher,* 7**,** 27-35.
MCKENNA, L. & WELLARD, S. 2009. Mothering: an unacknowledged aspect of undergraduate clinical teachers' work in nursing. *Advances in Health Sciences Education,* 14**,** 275-285.
MCKIMM, J. & SWANWICK, T. 2009. Setting learning objectives. *British Journal of Hospital Medicine,* 70**,** 406-409.
MCLEAN, M. 2006. *Pedagogy and the university: critical theory and practice,* London, Continuum International Publishing Group.
MCNEIL, H. P., HUGHES, C. S., TOOHEY, S. M. & DOWTON, B. 2006. An innovative outcomes-based medical education program built on adult learning principles. *Medical Teacher,* 28**,** 527-534.
MCNIFF, J. & WHITEHEAD, J. 2002. *Action research: principles and practice, 2nd edition,* London, RoutledgeFalmer.
MEDINE2 WEBSITE. 2011. *Medical Education in Europe 2* [Online]. Available: http://www.medine2.com/ [Accessed Accessed 7th April 2011.
MEDINE WEBSITE. 2007. *Medical Education in Europe* [Online]. Available: http://medine2.com/archive/medine1/ [Accessed Accessed 25th August 2011.
MENNIN, S. 2010. Self-organisation, integration and curriculum in the complex world of medical education. *Medical Education,* 44.
MERRIAM, S. B. 2009. *Qualitative research: a guide to design and implementation,* San Francisco, Jossey-Bass.
MEZIROW, J. 1991. *Transformative dimensions of adult learning,* San Francisco, Jossey-Bass.
MILLER, G. E. 1990. The assessment of clinical skills / competence / performance. *Academic Medicine,* 65**,** S63-67.
MOLENAAR, W. M., ZANTING, A., VAN BEUKELEN, P., DE GRAVE, W., BAANE, J. A., BUSTRAAN, J. A., ENGBERS, R., FICK, T. E., JACOBS, J. C. G. & VERVOORN, J. M. 2009. A framework of teaching competencies across the medical education continuum. *Medical Teacher,* 31**,** 390-396.
MONROUXE, L. V. 2010. Identity, identification and medical education: why should we care? *Medical Education,* 44**,** 40-49.

MORCKE, A. M. & EIKA, B. 2009. Medical faculty and curriculum design - 'No, no, it's like this: you give your lectures...'. *Medical Teacher,* 31**,** 642-648.
MORRIS, C. 2011. Learning and teaching. *In:* MCKIMM, J. & FORREST, K. (eds.) *Professional practice for foundation doctors.* Exeter: Learning Matters Ltd.
MORRIS, D. & TURNBULL, P. 2004. Using student nurses as teachers in inquiry-based learning. *Journal of Advanced Nursing,* 45**,** 136-144.
MORRISON, E. H., BOKER, J. R., HOLLINGSHEAD, J., PRISLIN, M. D., HITCHCOCK, M. A. & LITZELMAN, D. K. 2002. Reliability and validity of an Objective Structured Teaching Examination for generalist resident teachers. *Academic Medicine,* 77**,** S29-S32.
MORRISON, E. H., LEWIS, E. M., GABBERT, C. C., BOKER, J. R., KUMAR, B. & HARTHILL, M. 2003. Evaluating a 'service elective' in clinical teaching for medical students. *Medical Teacher,* 25**,** 662-663.
MURRY, J. W. & HAMMONS, J. O. 1995. Delphi: a versatile methodology for conducting qualitative research. *Review of Higher Education,* 18**,** 423-436.
NEIGHBOUR, R. 2004. *The inner apprentice: an awareness-centred approach to vocational training for general practice, 2nd edition,* Abingdon, Radcliffe Medical Press.
NES 2007. NES survey of Scottish consultant workforce. Edinburgh: NHS Education for Scotland.
NES. 2011. *Scottish Online Appraisal Resource* [Online]. Available: http://www.scottishappraisal.scot.nhs.uk/ [Accessed NHS Education for Scotland. Accessed: 20th February 2011.
NESTEL, D. & KIDD, J. 2002. Evaluating a teaching skills workshop for medical students. *Medical Education,* 36**,** 1094-1095.
NESTEL, D. & KIDD, J. 2005. Peer assisted learning in patient-centred interviewing: the impact on student tutors. *Medical Teacher,* 27**,** 439-44.
NEWBLE, D., STARK, P., BAX, N. & LAWSON, M. 2005. Developing an outcome-focused core curriculum. *Medical Education,* 39**,** 680-687.
NHS. 2008. *Professional Development: Competence Framework* [Online]. Available: http://www.connectingforhealth.nhs.uk/systemsandservices/capability/phi/personal/learningweb/professional/competence [Accessed Accessed: 14th June 2008.
NHS. 2010. *Developing the clinical teacher* [Online]. Available: http://www.foundationprogramme.nhs.uk/download.asp?file=31_8_Developing_the_clinical_teacher_assessment_form_F1.pdf [Accessed Accessed 20th February 2011.
NHS. 2011a. *About the academic foundation programme* [Online]. Available: http://www.foundationprogramme.nhs.uk/pages/academic-programmes/about-the-academic-foundation-programme [Accessed Accessed 20th February 2011.
NHS. 2011b. *The Foundation Programme* [Online]. Available: http://www.foundationprogramme.nhs.uk/pages/home [Accessed 20th February 2011.
NHS TAYSIDE ACT GROUP. 2011. *NHS Tayside medical ACT: undergraduate teaching update 2010-11* [Online]. Available: http://www.nes.scot.nhs.uk/media/308934/act-teaching-update_tayside_2011.pdf
NIXON, J. 2004. Education for the good society: the integrity of academic practice. *London Review of Education,* 2**,** 245-252.

NORMAN, G. 2011. Fifty years of medical education research: waves of migration. *Medical Education,* 45**,** 785-791.
NORMAN, G., DORE, K., KREBS, J. & NEVILLE, A. J. 2007. The power of the plural: effect of conceptual analogies on successful transfer. *Academic Medicine,* 82**,** S16-S18.
NORMAN, G. R. & STREINER, D. L. 2003. *PDQ statistics, 3rd edition,* Hamilton, BC Decker Inc.
ONG, L. M. L., DE HAES, J. C. J. M., HOOS, A. M. & LAMMES, F. B. 1995. Doctor-patient communication: a review of the literature. *Social Science & Medicine,* 40**,** 903-918.
OSTAPCHUK, M., PATEL, P. D., HUGHES MILLER, K., ZIEGLER, C. H., GREENBERG, R. B. & HAYNES, G. 2010. Improving residents' teaching skills: a program evaluation of residents as teachers course. *Medical Teacher,* 32**,** e49-e56.
OZGA, J. 2005. Modernizing the education workforce: a perspective from Scotland. *Educational Review,* 57**,** 207-219.
OZGA, J. & JONES, R. 2006. Travelling and embedded policy: the case of knowledge transfer. *Journal of Education Policy,* 21**,** 1-17.
PAES, P. & WEE, B. 2008. A Delphi study to develop the Association for Palliative Medicine consensus syllabus for undergraduate palliative medicine in Great Britain and Ireland. *Palliative Medicine,* 22**,** 360-364.
PALÉS, J., CARDELLACH, F., ESTRACH, M., GOMAR, C., GUAL, A., PONS, F. & BOMBÍ, J. A. 2004. Defining the learning otucomes of graduates from the medical school at the University of Barcelona (Catalonia, Spain). *Medical Teacher,* 3**,** 239-243.
PALEY, J. & LILFORD, R. 2011. Qualitative methods: an alternative view. *British Medical Journal,* 342**,** 956-958.
PARLIAMENT 1858. The Medical Act. UK: HMSO.
PARLIAMENT. 1983. *The Medical Act* [Online]. UK: HMSO. Available: http://www.gmc-uk.org/about/legislation/medical_act.asp.
PASQUALE, S. J. & CUKOR, J. 2007. Collaboration of junior students and residents in a teacher course for senior medical students. *Medical Teacher,* 29**,** 572-576.
PASQUALE, S. J. & PUGNAIRE, M. P. 2002. Preparing medical students to teach. *Academic Medicine,* 77**,** 1175.
PASQUINELLI, L. M. & GREENBERG, L. W. 2008. A review of medical school programs that train medical students as teachers (MED-SATS). *Teaching and Learning in Medicine,* 20**,** 73-81.
PATTERSON, F., FERGUSON, E. & THOMAS, S. 2008. Using job analysis to identify core and specific competencies: implications for selection and recruitment. *Medical Education,* 42**,** 1195-1204.
PAVIA, R. E. A., KIENZLER, L. M. & ANDERSON, M. B. 1982. Preparation for the teaching role in residencies: an elective for medical students. *Journal of Medical Education,* 57**,** 792-794.
PEETS, A. D., CODERRE, S., WRIGHT, B., JENKINS, D., BURAK, K., LESKOSKY, S. & MCLAUGHLIN, K. 2009. Involvement in teaching improves learning in medical students: a randomized cross-over study. *BMC Medical Education,* 9**,** 55.
PELL, G. 2005. Use and misuse of Likert scales. *Medical Education,* 39**,** 970.

PETERS, S. & LIVIA, A. 2006. Relevant behavioural and social science for medical undergraduates: a comparison of specialist and non-specialist educators. *Medical Education,* 40**,** 1020-1026.
PETRIE, A. & SABIN, C. 2000. *Medical statistics at a glance,* Oxford, Blackwell Science Ltd.
PMETB. 2010. *Postgraduate Medical Education and Training Board merger with the GMC* [Online]. Available: http://www.pmetb.org.uk/ [Accessed Accessed 7th June 2010.
POSTMAN, N. & WEINGARTNER, C. 1971. *Teaching as a subversive activity,* Middlesex, Penguin Books.
PRATT, D. & ASSOCIATES 1998. *Five perspectives on teaching in adult and higher education,* Malabar, Florida, Krieger Publishing.
PRATT, D. D. 1992. Conceptions of teaching. *Adult Education Quarterly,* 42**,** 203-220.
PRATT, D. D., COLLINS, J. B. & SELINGER, S. J. 2001. *Development and use of the Teaching Perspectives Inventory (TPI),* American Educational Research Association (AERA) Annual Meeting, Seattle, April 10-14. Paper online: http://www.teachingperspectives.com/PDF/development1.pdf.
PRATT, D. D., HARRIS, P. & COLLINS, J. B. 2009. The power of one: looking beyond the teacher in clinical instruction. *Medical Teacher,* 31**,** 133-137.
PRIDEAUX, D. 2000. The Emperor's new clothes: from objectives to outcomes. *Medical Education,* 34**,** 168-169.
PROCHASKA, J. M. & DICLEMENTE, C. C. 1983. Stages and process of self-change of smoking: toward an integrative model of change. *Journal of Consulting and Clinical Psychology,* 51**,** 390-395.
PROCHASKA, J. M., PROCHASKA, J. O. & LEVESQUE, D. A. 2001. A transtheoretical approach to changing organisations. *Administration and Policy in Mental Health,* 28**,** 247-261.
PUGSLEY, L., BRIGLEY, S., ALLEREY, L. & MACDONALD, J. 2008. Counting quality because quality counts: differing standards in master's in medical education programmes. *Medical Teacher,* 30**,** 80-85.
RACE, P. 2010. *Making learning happen: a guide for post-compulsory education, 2nd edition,* London, SAGE Publications Ltd.
RACHAL, J. R. 2002. Andragogy's detectives: a critique of the present and a proposal for the future. *Adult Education Quarterly,* 52**,** 210-227.
RAMSDEN, P. 2003. *Learning to teach in higher education, 2nd edition.,* London, UK, RoutledgeFalmer.
RCGP 2006. Curriculum for speciality training for general practice: the learning and teaching guide. London: Royal College of General Practitioners. Online: http://www.gmc-uk.org/Guide_for_Learners_and_Teachers_01.pdf_30449626.pdf.
RCP. 2010. *Royal College of Physicians - History and Heritage* [Online]. Available: http://www.rcplondon.ac.uk/history-heritage/College-history-new [Accessed Accessed 7th June 2010.
RCSED. 2010. *The Royal College of Surgeons of Edinburgh - History of the College* [Online]. Available: http://www.rcsed.ac.uk/site/345/default.aspx [Accessed Accessed 7th June 2010.
REES, C. 2004. The problem with outcomes-based curricula in medical education: insights from educational theory. *Medical Education,* 38**,** 593-598.

RETHANS, J.-J., NORCINI, J. J., BARON-MALDONADO, M., BLACKMORE, D., JOLLY, B. C., LADUCA, T., LEW, S., PAGE, G. G. & SOUTHGATE, L. H. 2002. The relationship between competence and performance: implications for assessing practice performance. *Medical Education,* 36**,** 901-909.

RICHARDSON, J. T. E. 2005. Students' approaches to learning and teachers' approaches to teaching in higher education. *Educational Psychology,* 25**,** 673-680.

RIGBY, E. 2007. Taking forward aims of the Bologna Declaration: European core curriculum - the students' perspective. *Medical Teacher,* 29**,** 83-84.

ROBSON, J. 2006. *Teacher professionalism in further and higher education,* London, Routledge.

RODRIGUES, J., SENGUPTA, A., MITCHELL, A., KANE, C., KANE, C., MAXWELL, S., CAMERON, H. S., ROSS, M. T., GARDEN, O. J. & FORD, M. 2008. The South-East Scotland foundation doctor training programme - is "near-peer" teaching feasible, efficacious and sustainable on a regional scale? *Medical Teacher,* 31**,** 51-57.

ROFF, S. 2006. The Dundee Ready Educational Environment Measure (DREEM) - a generic instrument for measuring students' perceptions of undergraduate health professions curricula. *Medical Teacher,* 27**,** 322-325.

ROHAN, D., AHERN, S. & WALSH, K. 2009. Defining an anaesthetic curriculum for medical undergraduates. A Delphi study. *Medical Teacher,* 31**,** e1-e5.

ROSS, M., EVANS, P., GOWING, K., ROSS, K., DE ROOS, P. & SANA, S. Learning to teach: peer assisted learning in the medical curriculum. Workshop at AMEE Annual Conference, 2005 Amsterdam, The Netherlands.

ROSS, M. T. 2004. Peer assisted learning: observing the tutors. *Presented at LTSN-01 workshop 'Teaching medical undergraduates to teach'.* Nottingham.

ROSS, M. T. 2007. The Bologna Process in Medicine. *Presentation during the workshop 'Bachelor and Masters of medicine in Europe' at AMEE Annual Conference.* Trondheim, Norway.

ROSS, M. T. & CAMERON, H. S. C. 2007. AMEE Guide 30: Peer assisted learning: a planning and implementation framework. *Medical Teacher,* 29**,** 527-545.

ROSS, M. T. & CUMMING, A. D. 2007a. Common learning outcomes for medical education in Europe. *Presentation at European Conference on Educational Research.* Ghent, Belgium, 19-21st September.

ROSS, M. T. & CUMMING, A. D. 2007b. The Tuning project: defining and gaining Europe-wide consensus on core learning outcomes for medical graduates. *Short communication at AMEE Annual Conference.* Trondheim, Norway, August.

ROSS, M. T. & CUMMING, A. D. 2009. Peer assisted learning. *In:* DENT, J. A. & HARDEN, R. (eds.) *A practical guide for medical teachers, 3rd edition.* Edinburgh: Elsevier.

ROSS, M. T., ELLAWAY, R. E. & CAMERON, H. S. 2007. The CHERRI project: using clinical recordings in academic non-clinical settings. *Presentation at JISC Digital Repositories Conference.* Manchester, 5th-6th June.

ROSS, M. T. & KREBER, C. 2011. Learning to teach in the undergraduate medical curriculum: a Delphi study of UK experts in medical education. *Short pesentation at AMEE Annual Conference.* Vienna, Austria.

ROSS, M. T., MACRAE, C., SCOTT, H., SHIPPEY, B., EDGAR, S., MOFFAT, M., AITKEN, D., JACKSON, C., EVANS, P. & SCOTT, J. 2011a. *Scottish teaching competences framework survey* [Online]. Edinburgh: The University

of Edinburgh. Available: http://www.surveymonkey.com/s/GK3W3PH [Accessed Last accessed 19th July 2011.
ROSS, M. T., PEERAER, G. & CUMMING, A. D. 2011b. Bologna first cycle in medicine. *Poster presentation at AMEE Annual Conference.* Vienna, Austria.
ROSS, M. T., PRONK, S., DE GRAAF, M., BRYDEN, J., TEOH, K. & STENFORS-HAYES, T. 2006. How can medical students learn to teach? *Workshop with short presentations at AMEE Annual Conference.* Genoa, Italy.
ROSS, M. T. & STENFORS-HAYES, T. 2008a. Development of a framework of medical undergraduate teaching activities. *Medical Education,* 42**,** 915-922.
ROSS, M. T. & STENFORS-HAYES, T. 2008b. What do medical teachers do? *The Clinical Teacher,* 5**,** 159-162.
ROSS, M. T. & STENFORS-HAYES, T. 2009. Developing a typology of learning and teaching situations in undergraduate medical education. *Poster presented at ASME Annual Scientific Meeting.* Edinburgh, 15-17 July 2009.
ROSS, N. & DAVIES, D. 1999. Outcome-based learning and the electronic curriculum at Birmingam medical school. *Medical Teacher,* 21**,** 26-31.
SACKETT, D. L., STRAUS, S. E., RICHARDSON, W. S., ROSENBERG, W. & HAYNES, R. B. 2000. *Evidence-based medicine: how to practice and teach EBM,* London, Churchill Livinstone.
SALERNO-KENNEDY, R., HENN, P. & O'FLYNN, S. 2010. Implementing peer tutoring in a graduate medical education programme. *The Clinical Teacher,* 7**,** 83-89.
SALTER, B. 2001. Who rules? The new politics of medical regulation. *Social Science & Medicine,* 52**,** 871-883.
SCHIFFERDECKER, K. E. & REED, V. A. 2009. Using mixed methods research in medical education: basic guidelines for researchers. *Medical Education,* 43**,** 637-644.
SCHÖN, D. A. 1983. *The reflective practitioner: how professionals think in action,* London, Temple Smith.
SCHÖN, D. A. 1987. *Educating the reflective practitioner: toward a new design for teaching and learning in the professions,* San Fransisco, Jossey-Bass.
SCHWARZ, M. R., WOJTCZAK, A. J. & STERN, D. T. 2007. The outcomes of global minimum essential requirements (GMER) pilot implementation in China. *Medical Teacher,* 29**,** 699-705.
SCOTT, J. 2011. Faculty development for Scotland: update report to stakeholders May 2011. Edinburgh: NHS Education for Scotland.
SCOTT, J. & IRVINE, S. 2010. Initial proposals for medical education and staff development project. Edinburgh: NHS Education for Scotland.
SEELY, A. J. E. 1999. The teaching contributions of residents. *Canadian Medical Association Journal,* 16**,** 1239.
SHARIQ, O. 2011. The need for more teaching-skills training for medical students. *Academic Medicine,* 86**,** 407-408.
SHEHATA, Y., ROSS, M. T. & SHEIKH, A. 2006. Undergraduate allergy teaching in a UK medical school: mapping and assessment of an undergraduate curriculum. . *Primary Care Respiratory Journal,* 15**,** 173-178.
SHEHATA, Y., ROSS, M. T. & SHEIKH, A. 2007. Undergraduate allergy teaching in a UK medical school: comparison of the described and delivered curriculum. . *Primary Care Respiratory Journal,* 16**,** 16-21.
SHULMAN, L. S. 2000. From Minsk to Pinsk: why a scholarship of teaching and learning? *The Journal of Scholarship of Teaching and Learning,* 1**,** 48-53.

SILVERMAN, D. 2005. *Doing qualitative research, 2nd edition,* London, SAGE Publications Ltd.
SIMPSON, J. G., FURNACE, J., CROSBY, J. R., CUMMING, A. D., EVANS, P. A., DAVID, M. F. B., HARDEN, R. M., LLOYD, D., MCKENZIE, H., MCLACHLAN, J. C., MCPHATE, G. F., PERCY-ROBB, I. W. & MACPHERSON, S. G. 2002. The Scottish doctor - learning outcomes for the medical undergraduate in Scotland: a foundation for competent and reflective practitioners. *Medical Teacher,* 24**,** 136-143.
SMITH, J. 2004. *The Shipman Inquiry. Fifth report - safeguarding patients: lessons from the past - proposals for the future,* London, HMSO. Online: http://www.shipman-inquiry.org.uk/fifthreport.asp.
SMITH, J. 2005. *Sixth report - Shipman: the final report,* London, HMSO. Online: http://www.shipman-inquiry.org.uk/finalreport.asp.
SMITH, K. L., PETERSEN, D. J., SORIANO, R. P., FRIEDMAN, E. & BENSINGER, L. D. 2007. Training tomorrow's teachers today: a national medical student teaching and leadership retreat. *Medical Teacher,* 328-334.
SMITH, K. S. & SIMPSON, R. D. 1995. Validating teaching competencies for faculty members in higher education: a national study using the Delphi method. *Innovative Higher Education,* 19**,** 223-234.
SMITH, S. R. & DOLLASE, R. 1999. Planning, implementing and evaluating a competency-based curriculum. *Medical Teacher,* 21**,** 15-22.
SNYDER, B. R. 1970. *The hidden curriculum,* New York, Alfred A. Knopf, Inc.
SOANES, C. & HAWKER, S. 2005. *Compact Oxford english dictionary of current English,* Oxford, Oxford University Press.
SOBRAL, D. T. 1989. Learning the educator role: a course for medical students. *Medical Education,* 23**,** 70-76.
SORIANO, R. P., BLATT, B., COPLIT, L., CICHOSKIKELLY, E., KOSOWICZ, L., NEWMAN, L., PASQUALE, S. J., PRETORIUS, R., ROSEN, J. M., SAKS, N. S. & GREENBERG, L. 2010. Teaching medical students how to teach: a national survey of students-as-teachers programs in U.S. medical schools. *Academic Medicine,* 85**,** 1725-1731.
SPENCER, J. 2003. ABC of learning and teaching in medicine: learning and teaching in the clinical environment. *British Medical Journal,* 326**,** 591-594.
SQUIRES, G. 1999. *Teaching as a professional discipline,* London, Falmer Press.
STEINERT, Y., MANN, K., CENTENO, A., DOLMANS, D., SPENCER, J., GELULA, M. & PRIDEAUX, D. 2006. A systematic review of faculty development initiatives designed to improve teaching effectiveness in medical education: BEME Guide No. 8. *Medical Teacher,* 28**,** 497-526.
STENFORS-HAYES, T., HULT, H. & DAHLGREN, L. O. 2010a. What does it mean to be a good teacher and clinical supervisor in medical education? *Advances in Health Sciences Education,* 16**,** 197-210.
STENFORS-HAYES, T., HULT, H. & DAHLGREN, L. O. 2011a. Three ways of understanding development as a teacher. *European Journal of Dental Education,* 15**,** 1-7.
STENFORS-HAYES, T., HULT, H. & DAHLGREN, L. O. 2011b. What does it mean to be a mentor in medical education? *Medical Teacher,* 33**,** e423-428.
STENFORS-HAYES, T., KALÉN, S., HULT, H., DAHLGREN, L. O., HINDBECK, H. & PONZER, S. 2010b. Being a mentor for undergraduate medical students enhances personal and professional development. *Medical Teacher,* 32**,** 148-153.

STONE, S., ELLERS, B., HOLMES, D., ORGREN, R., QUALTERS, D. & THOMPSON, J. 2002. Identifying oneself as a teacher: the perceptions of preceptors. *Medical Education,* 36**,** 180-5.
SUTKIN, G., WAGNER, E., HARRIS, I. & SCHIFFER, R. 2008. What makes a good clinical teacher in medicine? A review of the literature. *Academic Medicine,* 83**,** 452-466.
SWING, S. R. 2007. The ACGME outcome project: retrospective and prospective. *Medical Teacher,* 29**,** 648-654.
TAHERIAN, K. & SHEKARCHIAN, M. 2008. Mentoring for doctors. Do its benefits outweigh its disadvantages? *Medical Teacher,* 30**,** e95-e99.
TALBOT, M. 2004. Monkey see, monkey do: a critique of the competency model in graduate medical education. *Medical Education,* 38**,** 587-592.
TANDETER, H., CARELLI, F., TIMONEN, M., JAVASHVILI, G., BASAK, O., WILM, S., ZARBAILOV, N., SPIEGEL, W. & BREKKE, M. 2011. A 'minimal core curriculum' for family medicine in undergraduate medical education: a European delphi survey among EURACT representatives. *European Journal of General Practice,* [online ahead of print].
TATE, P. 2002. *The doctor's communication handbook, 4th edition,* Oxon, Radcliffe Medical Press.
TAVABIE, O. & BAKER, P. 2011. *Foundation doctors and bedside teaching. BMJ Careers* [Online]. Available: http://careers.bmj.com/careers/advice/view-article.html?id=20002382.
TAYLOR, E. W., TISDELL, E. J. & GUSIC, M. E. 2007. Teaching beliefs of medical educators: perspectives on clinical teaching in paediatrics. *Medical Teacher,* 29**,** 371-376.
TAYLOR, S., RIZVI, F., LINGARD, B. & HENRY, M. 1997. *Educational policy and the politics of change,* London, Routledge.
TEN CATE, O. 2007. A teaching rotation and a student teaching qualification for senior medical students. *Medical Teacher,* 29**,** 566-571.
TEO, A. R., HARLEMAN, E. & O'SULLIVAN, P. S. 2011. The key role of a transition course in preparing medical students for internship. *Academic Medicine,* 86**,** 860-865.
THE SCIENCE REGISTRY LTD. 2009. *Findamasters* [Online]. Available: http://www.findamasters.com [Accessed Accessed 17th May 2009.
TIGELAAR, D. E. H., DOLMANS, D. H. J. M., WOLFHAGEN, I. H. A. P. & VAN DER VLEUTEN, C. P. M. 2004. The development and validation of a framework for teaching competencies in higher education. *Higher Education,* 48**,** 253-268.
TIMESONLINE. 2010. *Good University Guide 2010 - Medicine* [Online]. Available: http://www.timesonline.co.uk/tol/life_and_style/education/sunday_times_university_guide/ [Accessed Accessed 5th June 2009.
TOPPING, K. J. 1996. The effectiveness of peer tutoring in further and higher education: A typology and review of the literature. *Higher Education,* 32**,** 321-345.
TRIGWELL, K. & PROSSER, M. 1996. Changing approaches to teaching: a relational perspective. *Studies in Higher Education,* 21**,** 275-284.
TRIGWELL, K., PROSSER, M. & WATERHOUSE, F. 1999. Relations between teachers' approaches to teaching and students' approaches to learning. *Higher Education Research and Development,* 27**,** 143-153.

TUNING LATIN AMERICA PROJECT. 2011. *Tuning latin america project* [Online]. Available: Available: http://www.tuning.unideusto.org/tuningal/.

TWENGE, J. M. 2009. Generational changes and their impact in the classroom: teaching Generation Me. *Medical Education,* 43**,** 398-405.

TYLER, R. W. 1949. *Basic principles of curriculum and instruction,* Chicago, University of Chicago Press.

UKFPO. 2010. *The UK Foundation Programme Curriculum* [Online]. Cardiff: UK Foundation Programme Office. Available: http://www.foundationprogramme.nhs.uk/download.asp?file=Foundation_Curriculum_2010_WEB_Final.PDF

VAN DE WIEL, M. W. J., VAN DE BOSSCHE, P., JANSSEN, S. & JOSSBERGER, H. 2011. Exploring deliberate practice in medicine: how do physicians learn in the workplace? *Advances in Health Sciences Education,* 16**,** 81-95.

VAUGHN, L. M. & BAKER, R. C. 2008. Do different pairings of teaching styles and learning styles make a difference? Preceptor and resident perceptions. *Teaching and Learning in Medicine,* 20**,** 239-247.

VON FRAGSTEIN, M., SILVERMAN, J., CUSHING, A., QUILLIGAN, S., SALISBURY, H. & WISKIN, C. 2008. UK consensus statement on the content of communication curricula in undergraduate medical education. *Medical Education,* 42**,** 1100-1107.

WALKER, M. 2009. 'Making a world that is worth living in': humanities teaching and the formation of practical reasoning. *Arts and Humanities in Higher Education,* 8**,** 231-246.

WALL, D. & MCALEER, S. 2000. Teaching the consultant teachers: identifying the core content. *Medical Education,* 34**,** 131-138.

WASS, V. 2005. Ensuring medical students are "fit for purpose": it is time for the UK to consider a national licensing process. *British Medical Journal,* 331**,** 791-792.

WASS, V. & ARCHER, J. 2011. Assessing learners. *In:* DORNAN, T., MANN, K., SCHERPBIER, A. J. J. A. & SPENCER, J. (eds.) *Medical education: theory and practice.* Edinburgh: Churchill Livingstone.

WEISSMANN, P. F., BRANCH, W. T., GRACEY, C. F., HAIDET, P. & FRANKEL, R. M. 2006. Role modelling humanistic behavior: learning bedside manner from the experts. *Academic Medicine,* 81**,** 661-667.

WEURLANDER, M. & STENFORS-HAYES, T. 2008. Developing medical teachers' thinking and practice: impact of a staff development course. *Higher Education Research and Development,* 27**,** 143-153.

WEYRICH, P., CELEBI, N., SCHRAUTH, M., MÖLTNER, A., LAMMERDING-KÖPPEL, M. & NIKENDEI, C. 2009. Peer-assisted versus faculty staff-led skills laboratory training: a randomised controlled trial. *Medical Education,* 43**,** 113-120.

WFME 2003. *Basic medical education: WFME global standards for quality improvement,* Copenhagen, Denmark, World Federation for Medical Education.

WFME 2007. *World Federation for Medical Education global standards for quality improvement in medical education: European specifications,* Copenhagen, Denmark, World Federation for Medical Education.

WILKINSON, T. J., GILL, D. J., FITZJOHN, J., PALMER, C. L. & MULDER, R. T. 2006. The impact on students of adverse experiences during medical school. *Medical Teacher,* 28**,** 129-135.

WILLETT, T. G., MARSHALL, K. C., BROUDO, M. & CLARKE, M. 2007. TIME as a generic index for outcome-based medical education. *Medical Teacher,* 29**,** 655-659.

WILLIAMS, G. & LAU, A. 2004. Reform of undergraduate medical teaching in the United Kingdom: a triumph of evangelism over common sense. *British Medical Journal,* 329**,** 92-94.

WILLIAMS, P. L. & WEBB, C. 1994. The Delphi technique: a methodological discussion. *Journal of Advanced Nursing,* 19.

WILLIAMS, R. G. & KLAMEN, D. L. 2006. See one, do one, teach one - exploring the core teaching beliefs of medical school faculty. *Medical Teacher,* 28**,** 418-424.

WILSON, S., EAGLES, J. M., PLATT, J. E. & MCKENZIE, H. 2007. Core undergraduate psychiatry: what do non-specialists need to know? *Medical Education,* 41**,** 698-702.

WITTICH, C. M., REED, D. A., MCDONALD, F. S. & VARKEY, P. 2010. Transformative learning: a framework using critical reflection to link the improvement competencies in graduate medical education. *Academic Medicine,* 85**,** 1790-1793.

YOUNG, S. F. 2008. Theoretical frameworks and models of learning: tools for developing conceptions of teaching and learning. *International Journal for Academic Research,* 13**,** 41-59.

ZABAR, S., HANLEY, K., STEVENS, D. L., KALET, A., SCHWARTZ, M. D., PEARLMAN, E., BRENNER, J., KACHUR, E. K. & LIPKIN, M. 2004. Measuring the competency of residents as teachers. *Journal of General Internal Medicine,* 19**,** 530-533.

ZIJDENBOS, I., FICK, T. & TEN CATE, O. 2011. How we offer all medical students training in basic teaching skills. *Medical Teacher,* 33**,** 24-26.

(this page is intentionally blank)

Appendices

Appendix 1 – Synthesis of core competencies for all doctors who teach for 'Faculty Development for Scotland' project

Competencies in teaching for all doctors in Scotland involved in teaching, sources and synthesised as part of the 'Faculty Development for Scotland' project (Ross *et al.* 2011b) from the following sources:

AME (2009) elements and standards numbered as original
AMRC (2009) knowledge (K), skills (S), behaviours (B) and level descriptors (L) from 'Section 6.3 Teaching and Training' numbered sequentially
FPC (UKFPO 2010) outcome (O), competences for FY1 (C1) and FY2 (C2) and knowledge (K) from 'Section 13 Teaching and Training' lettered sequentially
GMP (GMC 2006) numbered as original
HEA (2006) areas of activity (AA), core knowledge (CK) and prof. values (PV)
TD3 (GMC 2009b) numbered as original
SCAS (GMC 2010f) mandatory requirements numbered as original
TTD (GMC 2011g) standards (S) and mandatory requirements numbered as original
Added by group – added by the Faculty Development for Scotland Working Group

No.	Competence / Learning Outcome Respondents are asked '***How important do you think it is for all consultants and general practitioners working in Scotland who teach or train undergraduate medical students or postgraduate trainees to be able to:'***	Source ***Key to literature sources above***
1	**Willingness to engage and develop as an educator**	
1.1	Demonstrate commitment to supporting learners of all disciplines and stages of training, remain accessible and approachable when supervising, and protect scheduled teaching time	AME-3.1.1 TTD-1.3 TD3-5c
1.2	Demonstrate the knowledge, skills, attitudes and behaviours to undertake a teaching role	FPC-O GMP-15+16
1.3	Demonstrate willingness to become involved in medical education activities	AMRC-B9 AMRC-B10
1.4	Identify their own learning needs as an educator and plan activities to meet these	FPC-C2a
2	**Understanding of role as an educator**	
2.1	Recognise the importance of the role of the doctor as an educator within the multidisciplinary team	AMRC-B2
2.2	Demonstrate understanding of their own and others' educational roles	AME-6.2.1 TTD-6.39+S
2.3	Demonstrate awareness of their limitations in relation to teaching and assessment, and know when to refer or seek help from others	SCAS-10.3 GMP-3a
2.4	Demonstrate understanding of the structure and purpose of the curriculum for their students / trainees	TTD-S
2.5	Encourage discussions with colleagues to ensure a consistent approach to education and to share knowledge and understanding	TTD-6.33 AMRC-B6 HEA-PV3
3	**Educational theory**	

No.	Competence / Learning Outcome **Respondents are asked '*How important do you think it is for all consultants and general practitioners working in Scotland who teach or train undergraduate medical students or postgraduate trainees to be able to:'***	Source ***Key to literature sources above***
3.1	Demonstrate understanding of basic educational theories and principles relevant to medical education	AME-2.1.1 AMRC-K1 FPC-K1 HEA-CK3
3.2	Demonstrate awareness of literature relevant to current developments in medical education and apply this to their teaching	AME-2.2.1 AMRC-K2+S1
4	**Environment**	
4.1	Demonstrate awareness of what is meant by the 'learning environment', including its emotional, physical and psychological elements	AME-1.3.3+3.3.1 TTD-6.18 AMRC-B5
4.2	Take action to achieve an effective learning environment	AME-3.3.2
4.3	Model the values, attitudes and behaviours they expect from trainees	AMRC-B11
5	**Needs assessment**	
5.1	Gather basic information on the developmental needs of learners	AME-5.2.2 AMRC-S2+B5 FPC-C2a
5.2	Interpret information on the developmental needs of learners	AME-5.2.2 AMRC-S2
5.3	Set educational objectives	FPC-C2a AMRC-L4a
5.4	Adopt a learner-centred approach, recognising individuals' particular needs, interests and styles	FPC-K2
6	**Lesson planning**	
6.1	Demonstrate an appropriate grasp of subject material / content to be taught	HEA-CK1
6.2	Use appropriate and current curricula to inform teaching practice, taking into consideration prior learning of students or trainees	AMRC-S3+S2
6.3	Demonstrate the application of learning and teaching principles in the design of a session, unit, module or subject	AME-5.1.3
6.4	Plan educational activities to meet identified learning needs or objectives	AMRC-S2+L4a FPC-C2a
6.5	Demonstrate appropriate preparation for teaching, including managing time and resources	FPC-C2b AME-6.1.1 AMRC-S15
6.6	Vary teaching format and stimulus, appropriate to situation and subject	AMRC-S4
6.7	Select learning and teaching methods which are appropriate to the programme content and level	AME-3.4.2 HEA-CK2
6.8	Plan learning activities in the workplace	AMRC-S8
6.9	Prepare appropriate written materials to support teaching episodes	AMRC-L1a
6.10	Use and adapt existing materials to support teaching and learning	AME 3.4.3
7	**Planned teaching**	
7.1	Plan and deliver teaching involving patients	AMRC-S8 AME-3.2.1
7.2	Demonstrate effective lecture and presentation skills	AME-3.2.1 AMRC-S7 FPC-K5+C2c

No.	Competence / Learning Outcome Respondents are asked '*How important do you think it is for all consultants and general practitioners working in Scotland who teach or train undergraduate medical students or postgraduate trainees to be able to:'*	Source *Key to literature sources above*
7.3	Demonstrate effective small group teaching skills	AME 3.2.1 AMRC-S7+L2c FPC-C2c
7.4	Demonstrate effective clinical skills teaching	AME-3.2.1 AMRC-L2d
7.5	Demonstrate effective use of simulation technologies for learning and teaching including scenario debriefing	AME-3.2.1+2.6.2 HEA-CK4 TTD-8.7
7.6	Understand the principles of problem based learning	Added by group
7.7	Demonstrate competency in problem based learning facilitation	Added by group
8	**Opportunistic teaching**	
8.1	Identify and use available opportunities for learning and teaching	AMRC-S8+B4
8.2	Help students and trainees take advantage of available opportunities for learning and professional development	TTD-6.26+6.23
8.3	Involve learners in actual practice appropriate to their stage of learning and within the bounds of their competence	AME-3.6.2 AMRC-S9 TTD-6.29 TD3-108+109
8.4	Demonstrate the ability to provide educational, personal and professional support in relevant contexts	AME-3.1.2
8.5	Encourage learners to reflect on their experiences and practice	AME-3.7.1
9	**Mentoring / one-to-one supervision**	
9.1	Conduct developmental conversations to promote learner reflection through appraisal, supervision and mentoring	AMRC-S6
9.2	Mentor medical students, trainees, colleagues and members of the wider healthcare team	AMRC-L3c
9.3	Demonstrate effective one-to-one teaching skills	FPC-C1a
9.4	Demonstrate effective supervision of medical students, trainees, colleagues and members of the wider healthcare team	AMRC-L3c AMRC-L2a
10	**Appraisal**	
10.1	Demonstrate understanding the purposes of appraisal and performance review	AMRC-K4
10.2	Effectively appraise medical students, trainees, colleagues and members of the wider healthcare team	AMRC- K6+L3b
11	**eLearning & multimedia in education**	
11.1	Demonstrate the effective use of multimedia and online technologies to promote learning	AME-3.2.1+2.6.2 HEA-CK4
11.2	Adapt their own teaching practice where benefits of using technology have been identified	Added by group
12	**Structured assessment**	
12.1	Demonstrate understanding of the principles of assessment	FPC-K3 AME-4.2.1 AMRC-K5+K4
12.2	Demonstrate awareness of the purpose, timing and reporting arrangements of different assessments	AME-4.1.1+4.1.2; AMRC-K4
12.3	Demonstrate ability to use a basic range of methods to assess learners	AME-4.4.2
12.4	Accurately and objectively record the outcome of assessments in a suitable format (including ePortfolios) and in a timely manner	SCAS-13.1 GMP-18 TD3-5d
12.5	Demonstrate ability to create effective assessment materials	AMRC-L3a

No.	Competence / Learning Outcome **Respondents are asked '*How important do you think it is for all consultants and general practitioners working in Scotland who teach or train undergraduate medical students or postgraduate trainees to be able to:*'**	Source ***Key to literature sources above***
12.6	Demonstrate ability to plan and deliver an assessment programme to support educational activities	AMRC-L4b
13	**Workplace-based assessment**	
13.1	Demonstrate a clear understanding of the nature and purpose of workplace-based assessments	AMRC-B8+K7
13.2	Demonstrate ability to use approved workplace-based assessment tools	TTD-6.30 AMRC-L2b
13.3	Demonstrate ability to assess, review and report performance of students and other colleagues in the workplace reliably	FPC-C1b+c TTD-6.30
14	**Feedback**	
14.1	Apply the principles of good feedback	FPC-K4
14.2	Provide timely and effective feedback to learners on their performance	AME-3.5.3 AMRC-S5 TTD-6.31b FPC-C2d TD3—5e
14.3	Match the form of feedback to the purpose of the assessment (including workplace-based assessment)	SCAS-11.2 AMRC-L2b
15	**Learners in difficulty**	
15.1	Recognise the learner in difficulty	AMRC-S13
15.2	Demonstrate understanding of the process for dealing with a learner whose progress gives cause for concern	TTD-6.31f AMRC-K8
15.3	Take appropriate action to support the learner in difficulty, including referral to other services where relevant	AMRC-S13
16	**Careers guidance & exploration**	
16.1	Appreciate the importance of early and ongoing career guidance, and refer trainees to effective sources of career information	AMRC-S10
16.2	Advise on career choice and progression	TTD-6.31e AMRC-S10
17	**Quality enhancement**	
17.1	Seek and interpret feedback on their teaching	AME-3.5.1+5.5.1 AMRC-L1b HEA-AA6
17.2	Respond effectively to evaluation to enhance and improve educational provision	AME-5.5.2+1.6.1 AMRC-B9+B13
17.3	Demonstrate willingness to advance own educational capability through continuous learning and reflective practice	AME-1.4.2 AMRC-B12
17.4	Contribute to the wider management of the quality of medical education through the gathering and reporting of quality measures as required by the education provider	TTD-2.2 TD3-48
18	**Balancing teaching with clinical care**	
18.1	Balance the needs of service delivery with education and manage time appropriately	AME-1.2.3 TTD-6.32 AMRC-B3
18.2	Use medical education to enhance the care of patients	AMRC-B2
19	**Ethicolegal issues**	
19.1	Demonstrate a standard of professional and educational practice consistent with the requirements of the General Medical Council	AME-1.1.1+1.1.2 TTD-6.38 AMRC-B7
19.2	Comply with relevant legislation such as the Equalities Act, European Working Time Regulation, Data Protection Act and Freedom of Information Act	TTD-2.1+3.1

No.	Competence / Learning Outcome Respondents are asked '***How important do you think it is for all consultants and general practitioners working in Scotland who teach or train undergraduate medical students or postgraduate trainees to be able to:'***	Source ***Key to literature sources above***
19.3	Discharge educational duties whilst maintaining the dignity and safety of patients at all times	AMRC-B1 AME-1.2.1 TTD-6.29 TD3-26
19.4	Act to ensure equality of opportunity for students, trainees, staff and professional colleagues	AME-1.5.1 TTD-3.4+S TD3-107
20	**Educational governance, management and leadership**	
20.1	Contribute to educational policy and development at local or national levels	AMRC-B14
20.2	Foster enthusiasm for medical education activity in others	AMRC-B10
20.3	Take on a leadership role in team, faculty or department teaching programmes	AMRC-S12 AME-6.2.2
20.4	Define the roles of the various bodies involved in medical education and other sectors	AMRC-K3 AME-6.3.1
21	**Educational research**	
21.1	Contribute to educational research or projects e.g. through the development of research ideas or data / information gathering	AMRC-S14

Appendix 2 – Materials from the expert Delphi

Appendix 2a - Delphi Round 1 Questions

1. Please write your name in the box (names will only be used to check who has responded and will not be downloaded with the data for analysis).

2. What does the term 'teaching' mean to you?

3. What does 'learning to teach' mean to you?

4. Do you think undergraduate medical students should learn to teach? Please explain your answer.

5. The General Medical Council stated in Tomorrow's Doctors 2003 (Curricular Outcome 8) that medical graduates must "Be able to demonstrate appropriate teaching skills" and "Be willing to teach colleagues and to develop their own teaching skills". In the 2009 draft they state that the medical graduate will be able to "Teach others" (point 166) and, more specifically, "Function effectively as a mentor and teacher including contributing to the appraisal, assessment and review of colleagues, giving effective feedback, and taking advantage of opportunities to develop these skills" (point 166f). How would you interpret these statements and what are the implications?

6. Please list any learning outcomes relating to teaching which you think are appropriate for the undergraduate medical curriculum (i.e. for medical students to learn).

7. In what ways do you think students could achieve, in the undergraduate medical curriculum, the learning outcomes you have suggested?

8. Are there any other experiences you think medical students should gain, or topics they should cover, in relation to teaching?

9. Do you see a role for formative, and or summative, assessment of medical students on their teaching abilities? Please explain your answer.

10. Who do you think would be most appropriate to specify intended learning outcomes in teaching for undergraduate medical education, and what factors should influence their decisions?

11. Do you have any other comments or suggestions on the subject of this research or the way in which it is being done?

12. What are your main areas of current activity / responsibility? (one or more)
    Undergraduate medical education
    Postgraduate speciality / GP training
    Staff development / postgraduate training in medical education

Educational research
Other

13. If you responded 'Other' to the above, please specify here

14. What is your disciplinary background? (select one or more)
Medically qualified and still practising clinically
Medically qualified but not currently engaged in clinical practice
Allied health professional (please specify)
Biomedical or social scientist (please specify)
Other (please specify)

15. If you responded 'Allied health professional', 'Biomedical or social scientist' or 'Other' to the above, please specify here.

16. How many years have you been involved in delivering medical / allied healthcare education?
None
1-2
3-5
6-10
11-15
16-20
21-25
26-30
Over 30 years

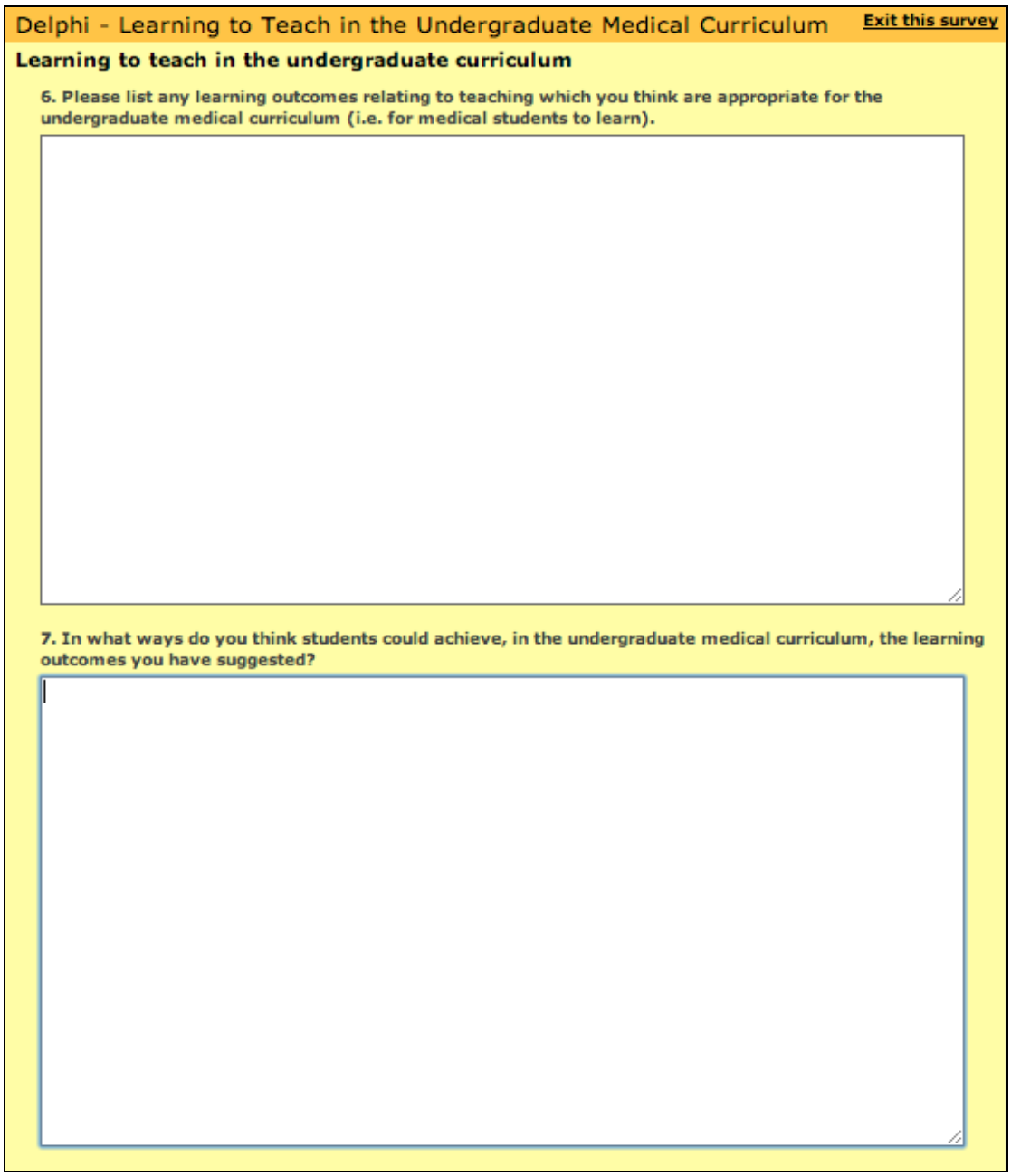
17. Do you have any formal qualifications in education?
None
Postgraduate Certificate in (medical / clinical) education or equivalent
Postgraduate Diploma in (medical / clinical) education or equivalent
MSc / MA in (medical / clinical) education or equivalent
PhD, EdD, MD in (medical / clinical) education or equivalent
Other

18. If you responded 'Other' to the above, please specify here

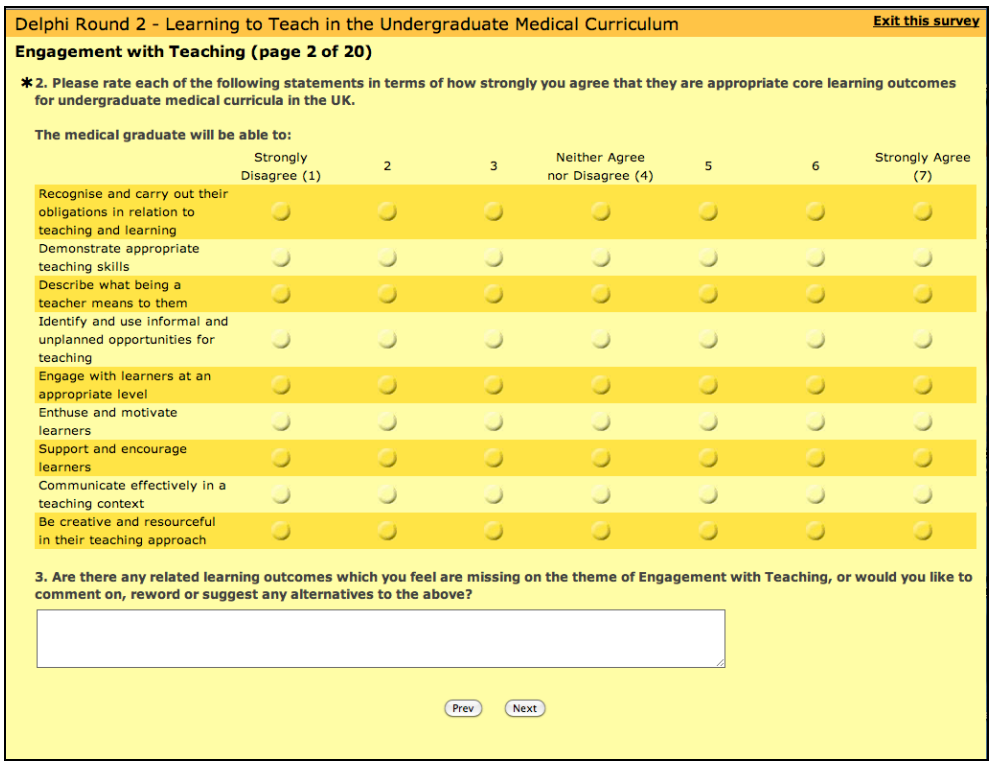
19. Do you regularly read and / or peer review for any of the following journals?
[Separate questions for 'Read' and for 'Peer Review' for each of the following]
Medical Education
Medical Teacher
The Clinical Teacher
Academic Medicine
Advances in Health Sciences Education
Other educational journal (please specify)

20. If you responded 'Other educational journal' to the above, please specify here

Appendix 2b – Delphi Round 1 screenshot



Appendix 2c - Delphi Round 2 screenshot



Delphi Round 2 - Learning to Teach in the Undergraduate Medical Curriculum — Exit this survey

Engagement with Teaching (page 2 of 20)

***2. Please rate each of the following statements in terms of how strongly you agree that they are appropriate core learning outcomes for undergraduate medical curricula in the UK.**

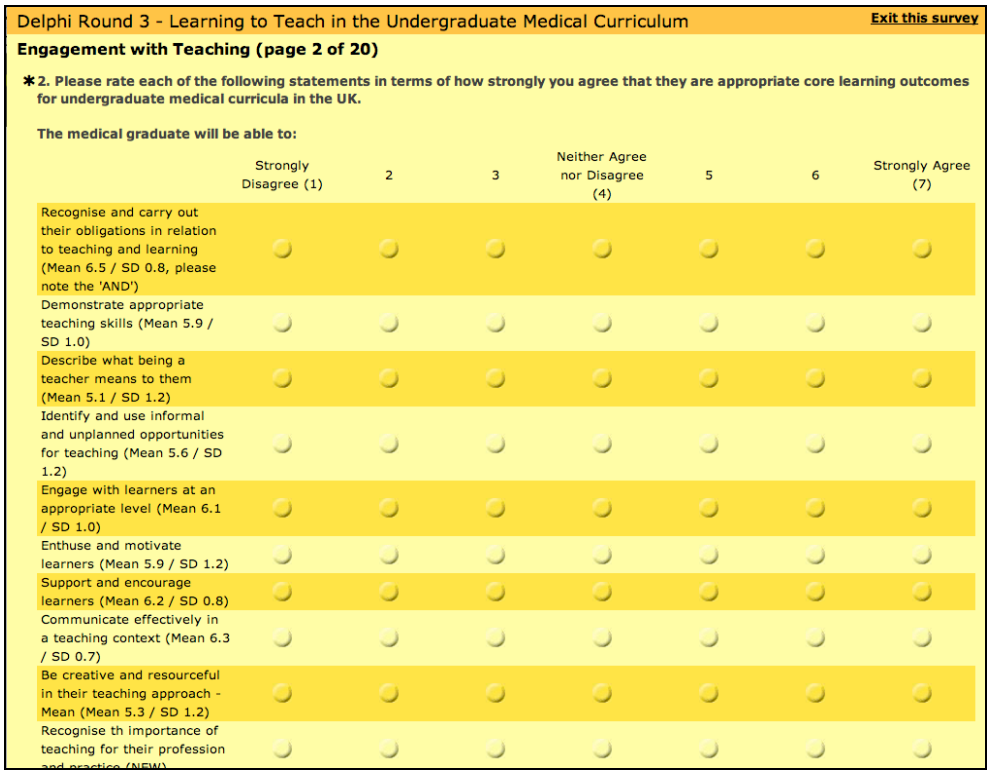
The medical graduate will be able to:

	Strongly Disagree (1)	2	3	Neither Agree nor Disagree (4)	5	6	Strongly Agree (7)
Recognise and carry out their obligations in relation to teaching and learning	○	○	○	○	○	○	○
Demonstrate appropriate teaching skills	○	○	○	○	○	○	○
Describe what being a teacher means to them	○	○	○	○	○	○	○
Identify and use informal and unplanned opportunities for teaching	○	○	○	○	○	○	○
Engage with learners at an appropriate level	○	○	○	○	○	○	○
Enthuse and motivate learners	○	○	○	○	○	○	○
Support and encourage learners	○	○	○	○	○	○	○
Communicate effectively in a teaching context	○	○	○	○	○	○	○
Be creative and resourceful in their teaching approach	○	○	○	○	○	○	○

3. Are there any related learning outcomes which you feel are missing on the theme of Engagement with Teaching, or would you like to comment on, reword or suggest any alternatives to the above?

Prev Next

Appendix 2d - Delphi Round 3 screenshot



Delphi Round 3 - Learning to Teach in the Undergraduate Medical Curriculum — Exit this survey

Engagement with Teaching (page 2 of 20)

***2. Please rate each of the following statements in terms of how strongly you agree that they are appropriate core learning outcomes for undergraduate medical curricula in the UK.**

The medical graduate will be able to:

	Strongly Disagree (1)	2	3	Neither Agree nor Disagree (4)	5	6	Strongly Agree (7)
Recognise and carry out their obligations in relation to teaching and learning (Mean 6.5 / SD 0.8, please note the 'AND')	○	○	○	○	○	○	○
Demonstrate appropriate teaching skills (Mean 5.9 / SD 1.0)	○	○	○	○	○	○	○
Describe what being a teacher means to them (Mean 5.1 / SD 1.2)	○	○	○	○	○	○	○
Identify and use informal and unplanned opportunities for teaching (Mean 5.6 / SD 1.2)	○	○	○	○	○	○	○
Engage with learners at an appropriate level (Mean 6.1 / SD 1.0)	○	○	○	○	○	○	○
Enthuse and motivate learners (Mean 5.9 / SD 1.2)	○	○	○	○	○	○	○
Support and encourage learners (Mean 6.2 / SD 0.8)	○	○	○	○	○	○	○
Communicate effectively in a teaching context (Mean 6.3 / SD 0.7)	○	○	○	○	○	○	○
Be creative and resourceful in their teaching approach - Mean (Mean 5.3 / SD 1.2)	○	○	○	○	○	○	○
Recognise th importance of teaching for their profession and practice (NEW)	○	○	○	○	○	○	○

Appendix 3 - Materials from the FY2 interviews

Appendix 3a – Participant information sheet for FY2 interviews

Learning to teach in the undergraduate medical curriculum

Foundation Year 2 doctor interviews

Information for Participants

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please read the following information carefully, and feel free to contact me (details below) with any questions or if you wish to discuss further.

What is the purpose of the study?
The General Medical Council and others have identified a need for UK medical graduates to be able to teach, although there is currently no agreement on what this actually means in practice or how it might be achieved. The results will inform the development of the undergraduate curriculum in Edinburgh and will be submitted and subsequently published as part of my doctoral research.

What will it involve?
You are being asked to participate in a one-to-one interview lasting around 40 minutes at a time and location convenient to you. I am happy to come to peripheral hospitals or surgeries and will provide refreshments (coffee and biscuits, sandwich lunch, supper, etc – depending on your preference and the time of day). The interview will be structured around a number of broad questions relating to teaching and learning to teach, and will be audio recorded and transcribed. You will be sent a copy of the transcription afterwards.

What's in it for me?
In addition to refreshments and an opportunity to participate in research which will influence undergraduate training locally and elsewhere, you will get:

- **An opportunity to reflect upon and discuss your teaching / training**
- **A full typed interview transcript which you can upload to your ePortfolio**
- **A certificate of participation which you can upload to your ePortfolio**
- **A full report on completion of the study**

Ethical issues
Written approval for the study has been obtained from the Scientific Officer of South East Scotland NHS Research Ethics Service. It has also passed through the Moray House School of Education Research Ethics approval process. No external funding has been sought for this research. Any responses you give will be treated in strictest confidence. Recordings and transcripts will be stored securely and all analyses or direct quotes will be anonymous.

Contact
If you are willing to take part in the research or wish to discuss further, please contact me:

e-mail **michael.ross@ed.ac.uk**

mobile phone

work phone **0131 242 6536**

Dr Michael Ross
Centre for Medical Education (CME)
The University of Edinburgh
GU304, The Chancellor's Building
49 Little France Crescent
Edinburgh. EH16 4SB

thank you !

Michael Ross, November 2010

Appendix 3b – Consent form for FY2 interviews

INTERVIEW & FOCUS GROUP CONSENT FORM
THE UNIVERSITY OF EDINBURGH
CENTRE FOR MEDICAL EDUCATION

Project Title: Learning to teach in the undergraduate medical curriculum: perspectives on appropriate student learning outcomes

Date and time: _____

Researcher: _____

Participant name: _____

& Contact details: _____

_____

1. I agree to participate in an interview / focus group undertaken by The University of Edinburgh Centre for Medical Education and their research collaborators.
2. I have been given a full explanation of the nature, purpose and likely duration of the interview / focus group, and have been given the opportunity to ask questions about these.
3. I have been assured that my participation is entirely voluntary and I understand that I am free to withdraw my participation at any time without needing to justify my decision. I can also ask afterwards for specific comments not to be used in the research.
4. I do not in any way feel pressured into participating in this research, and will try to respond openly and honestly to questions.
5. I understand that notes will be taken and the interview / focus group will be audio-recorded and transcribed. These will be treated in strictest confidence and will only be accessible to the research team. They will be destroyed when no-longer required for the research.
6. I understand that anonymous data from this interview / focus group may be published as research findings, including anonymised quotes, in journal articles, book chapters, on the world wide web or in a thesis / dissertation. I am aware that I can see any such material before publication upon request.

Signed by the Participant:
_____

Date:
_____

Appendix 3c – Example FY interview schedule (interview FY06)

1. IDENTITY / CONCEPTIONS OF TEACHING

a) Can you describe the sort of doctor you would like to be in 10 years?
[if not mentioned] Would you be involved in teaching?

b) Is teaching something you would like to develop?

c) What does the term 'teaching' mean to you?

d) Do you see yourself as a teacher at the moment?
[if yes] When did you start seeing yourself like that?
[if no] What would it take for you to see yourself as a teacher?

2. TEACHING IN FOUNDATION PROGRAMME

a) What teaching, in the broadest sense, have you done in FY1? [please describe]

b) How prepared did you feel for the teaching you did in FY1?

c) Do you think your teaching experiences are fairly typical of foundation doctors?

3. UNDERGRADUATE CURRICULUM

a) Do you think medical students should learn to teach?

b) What do you think they should learn in relation to teaching?

c) In what ways could they achieve this?

d) Do you see a role for assessment of medical students on teaching?

e) Who do you think should be involved in deciding what medical students must learn, and how should they do this? Is it the same for them learning about teaching?

4. REVIEW RESULTS OF EXPERT DELPHI

a) [Briefly describe Delphi and hand interviewee the summary sheet of LO]

b) Would you like to make any general comments about these statements?

5. OTHER

a) Do you have any other comments or questions in relation to the topic of this research or how it is being carried-out?

b) Demographics – age; sex; months in FY programme; jobs done in FY programme; medical school

Appendix 3d – Page 1 of Delphi outcomes for FY2 interviews

EXPERT DELPHI ON TEACHING IN THE MBChB AUG'09 – JULY '10

3 rounds of Delphi with 'expert' panel (those responsible for MBChB or MSc medical education programmes). 18 panel members in first round; 16 completed all 3 rounds.

Please tick whether you think each statement should be a core learning outcome for UK undergraduate medical curricula, and if so whether you think you learned it or not during your own undergraduate medical education.

not core	core, not learned	core & learned	
			ENGAGEMENT WITH TEACHING
☐	☐	☐	Recognise the importance of teaching for their profession and practice
☐	☐	☐	Communicate effectively in a teaching context
☐	☐	☐	Recognise and carry out their obligations in relation to teaching and learning
☐	☐	☐	Support and encourage learners
☐	☐	☐	Engage with learners at an appropriate level
☐	☐	☐	Demonstrate appropriate teaching skills
☐	☐	☐	Enthuse and motivate learners
☐	☐	☐	Identify and use informal and unplanned opportunities for teaching
☐	☐	☐	Be creative and resourceful in their teaching approach
☐	☐	☐	Describe what being a teacher means to them
			WHO IS TAUGHT
☐	☐	☐	Teach patients
☐	☐	☐	Teach peers / colleagues
☐	☐	☐	Teach medical students
☐	☐	☐	Demonstrate willingness to teach colleagues
☐	☐	☐	Teach more junior trainees
☐	☐	☐	Teach nurses and other healthcare professionals
☐	☐	☐	Mentor more junior trainees
			LEARNER-CENTREDNESS
☐	☐	☐	Adopt a learner-centred approach to teaching
☐	☐	☐	Help learners find ways to address their learning needs
☐	☐	☐	Help learners identify their learning needs
☐	☐	☐	Negotiate with students areas to be taught
☐	☐	☐	Facilitate learner self-assessment
☐	☐	☐	Apply their understanding of how individuals learn
☐	☐	☐	Help others undertake self-directed learning
☐	☐	☐	Reflect on their own and others' preferred learning styles

Appendix 4 – Materials from student focus groups

Appendix 4a – Participant information sheet for focus group

Learning to teach in the undergraduate medical curriculum

Focus groups with final year medical students

Information for Participants

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please read the following information carefully, and feel free to contact me (details below) if you have any questions or if you wish to discuss further.

What is the purpose of the study?
The General Medical Council and others have identified a need for UK medical graduates to be able to teach, although there is currently no agreement on what this actually means in practice or how it might be achieved. This research aims to shed light on these issues. It will inform the development of the Edinburgh medical curriculum and will also be submitted and subsequently published as part of my doctoral research.

What will it involve?
You are being asked to participate in a focus group with other final year medical students. It will last approximately ninety minutes, starting with a meal and refreshments. The focus group will be structured around a number of broad questions relating to teaching and learning to teach. It will be audio recorded and subsequently transcribed.

What's in it for me?
In addition to food / refreshments and an opportunity to participate in research which will influence the undergraduate programme locally and elsewhere, you will get:

- **An opportunity to reflect upon and discuss your teaching / learning to teach**
- **A certificate of participation in a focus group about your teaching**
- **A full report on completion of the study**

Ethical issues
Written approval for the study has been obtained from the College (MVM) Committee for the use of student volunteers, and it has also passed through the Moray House School of Education Research Ethics approval process. No external funding has been sought for this research. Your participation is entirely voluntary and you are free to withdraw at any time. You can ask for specific comments not to be used in the research if you wish. Your decision whether or not to participate, and any responses you give, will in no way affect your teaching or assessment in the MBChB. Any responses you give will be treated in strictest confidence. Recordings and transcripts will be stored securely and all analyses or direct quotes will be anonymous.

Contact
If you are willing to take part in the research or wish to discuss further, please contact me:

Dr Michael Ross
michael.ross@ed.ac.uk
0131 242 6536

Centre for Medical Education (CME)
The University of Edinburgh
GU304, The Chancellor's Building
49 Little France Crescent
Edinburgh. EH16 4SB

Michael Ross, March 2011

thank you !

Appendix 4b – Student focus group interview schedule

1. IDENTITY / CONCEPTIONS OF TEACHING

a) Can you each in turn describe the sort of doctor you would like to be in 10 years?
[if not mentioned by all] Would you be involved in teaching?

b) Is teaching something you would like to develop?

c) What does the term 'teaching' mean to you?

d) Do you see yourselves as teachers at the moment?
[if yes] When did you start seeing yourself like that?
[if no] What would it take for you to see yourself as a teacher?

2. TEACHING EXPERIENCES

a) What teaching have you done in relation to the medical programme?

b) Have you done any other teaching outside of the programme?

c) Do you think your teaching experiences are fairly typical of other medical students?

3. UNDERGRADUATE CURRICULUM

a) Do you think medical students should learn to teach?

b) What do you think they should learn in relation to teaching? In what ways could they achieve this?

c) Do you see a role for assessment of medical students on teaching?

d) Who do you think should be involved in deciding what medical students must learn? How should they do this? Is it the same for them learning about teaching?

e) Can you tell me about any teaching you have had from FY1 doctors?

4. REVIEW RESULTS OF EXPERT DELPHI

a) [Briefly describe Delphi and hand interviewee the summary sheet of LO]

b) Would you like to make any general comments about these statements?

c) Do you think you will achieve any of those you marked as 'not learned' in the remainder of the programme?

5. OTHER

a) Do you have any other comments or questions in relation to the topic of this research or how it is being carried-out?

b) Demographics – age; sex; mature entrants, ? other teaching experiences

Appendix 5 – Ethical approval

Appendix 5a - Permission from The University of Edinburgh Advisory Committee on use of Student Volunteers

Dermatology
SCHOOL *of* CLINICAL SCIENCES
and COMMUNITY HEALTH

The University of Edinburgh
Level 1, The Lauriston Building
Lauriston Place
Edinburgh EH3 9HA

Direct Dial 0131 536 2041
Fax 0131 229 8769
Email jrees@staffmail.ed.ac.uk
www.derm.med.ed.ac.uk

Our Ref: JLR/KM/App2009/3

4th February 2009

Dr Michael T Ross
Joint Programme Director, MSc Clinical Education
The Medical Teaching Organisation
The University of Edinburgh
GU304, The Chancellor's Building
49 Little France Crescent
EDINBURGH, EH16 4SB

Dear Dr Ross

Re: Learning to teach in the undergraduate medical curriculum: perspectives on appropriate student learning outcomes.

Thank you for submitting the above project to the Student Advisory Committee for the use of Student Volunteers for Experimental Work. I confirm that this has been approved by the Committee.

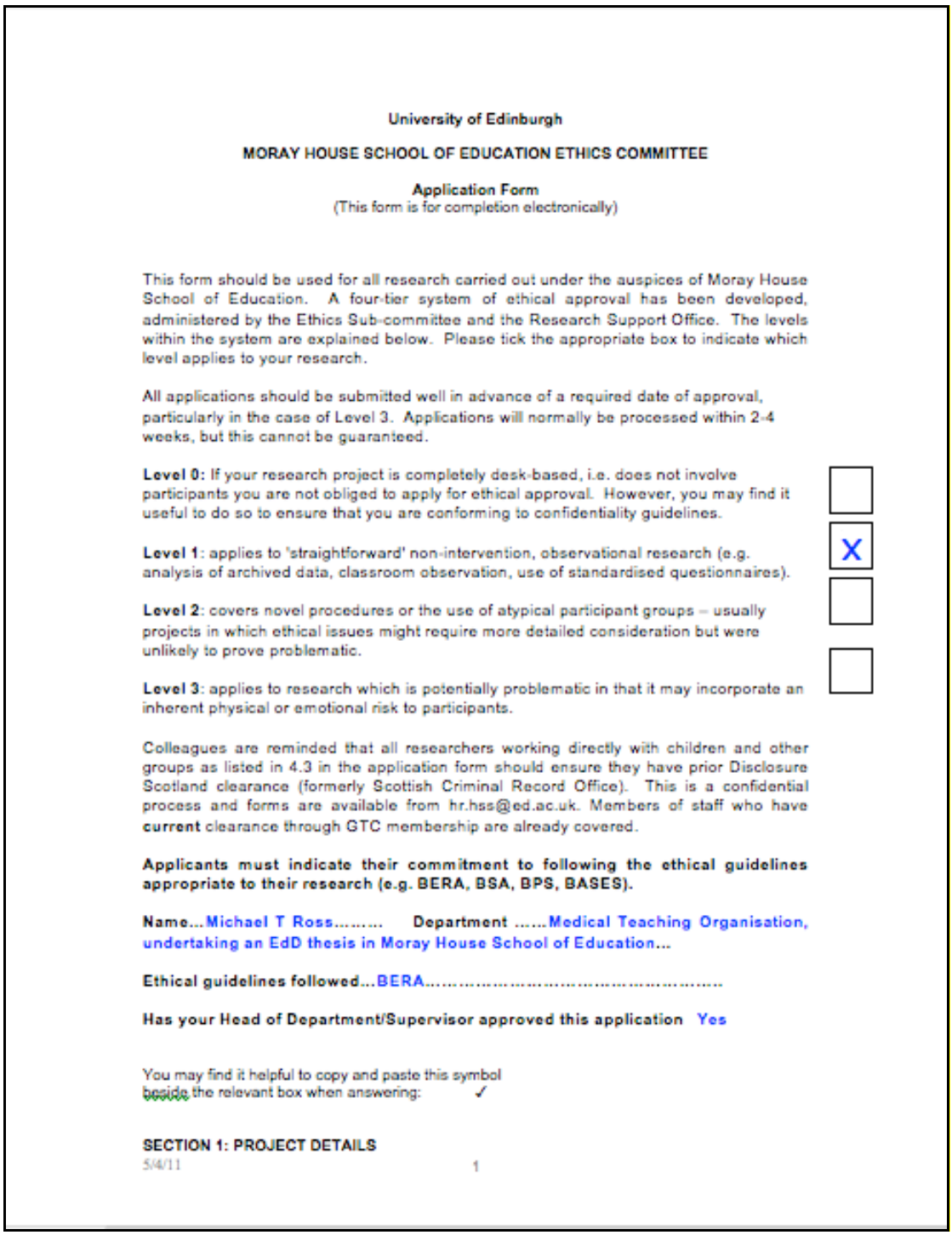
Kind Regards

pp. Karen Muir

Jonathan Rees
Convenor
Advisory Committee on the use of Student Volunteers for Experimental Work

GRANT CHAIR OF DERMATOLOGY
Professor Jonathan Rees FMedSci

Appendix 5b: p1 of Moray House School of Education ethics form



University of Edinburgh

MORAY HOUSE SCHOOL OF EDUCATION ETHICS COMMITTEE

Application Form
(This form is for completion electronically)

This form should be used for all research carried out under the auspices of Moray House School of Education. A four-tier system of ethical approval has been developed, administered by the Ethics Sub-committee and the Research Support Office. The levels within the system are explained below. Please tick the appropriate box to indicate which level applies to your research.

All applications should be submitted well in advance of a required date of approval, particularly in the case of Level 3. Applications will normally be processed within 2-4 weeks, but this cannot be guaranteed.

Level 0: If your research project is completely desk-based, i.e. does not involve participants you are not obliged to apply for ethical approval. However, you may find it useful to do so to ensure that you are conforming to confidentiality guidelines. ☐

Level 1: applies to 'straightforward' non-intervention, observational research (e.g. analysis of archived data, classroom observation, use of standardised questionnaires). X

Level 2: covers novel procedures or the use of atypical participant groups – usually projects in which ethical issues might require more detailed consideration but were unlikely to prove problematic. ☐

Level 3: applies to research which is potentially problematic in that it may incorporate an inherent physical or emotional risk to participants. ☐

Colleagues are reminded that all researchers working directly with children and other groups as listed in 4.3 in the application form should ensure they have prior Disclosure Scotland clearance (formerly Scottish Criminal Record Office). This is a confidential process and forms are available from hr.hss@ed.ac.uk. Members of staff who have **current** clearance through GTC membership are already covered.

Applicants must indicate their commitment to following the ethical guidelines appropriate to their research (e.g. BERA, BSA, BPS, BASES).

Name...Michael T Ross..... **Department** .....Medical Teaching Organisation, undertaking an EdD thesis in Moray House School of Education...

Ethical guidelines followed...BERA.....

Has your Head of Department/Supervisor approved this application Yes

You may find it helpful to copy and paste this symbol beside the relevant box when answering: ✓

SECTION 1: PROJECT DETAILS

5/4/11 1

Appendix 5c – e-mails with Moray House Research Support Office

Subject: EdD Dissertation Ethics Committee

Attachments: MVM ethics EdD Dec08.doc, MRoss EdD Ethics Feb09.jpg

Dear Sandra,

I am currently doing an EdD thesis and Carolin Kreber is my supervisor (cc'd). My thesis involves three different research methods, one of which involves medical students. I submitted an ethical approval form to the CMVM Advisory Committee on the use of Student Volunteers for Experimental Work which has been approved (copy of submission and approval letter attached). Charles suggested that I also pass the form and letter by the Convener / Chair of the Moray House Ethics Committee to see whether or not they feel it should formally be considered by your committee also.

Can you deal with this or should I send it to someone else?

Thanks and best wishes,
Michael.

Dr Michael T Ross
Joint Programme Director, MSc Clinical Education
The Medical Teaching Organisation
The University of Edinburgh
GU304, The Chancellor's Building
49 Little France Crescent
Edinburgh. EH16 4SB
United Kingdom

Subject: Re: EdD Dissertation Ethics Committee

Dear Michael
Many thanks for your email. Current practice in the School of Education is that students should complete the ethical application form together with their supervisor, both of you should sign it and keep a copy. Only if the ethical approval was Level 3 would the application need to come to the School Research Ethics committee. So you and Carolin will be able to deal with the ethical approval aspect.
Hope this helps.
Cheers
Sandra

Sandra Orr
Administrative Officer
University of Edinburgh
Research Support Office
Moray House School of Education, Holyrood Road, Edinburgh, EH8 8AQ
Tel: 0131 651 6386 I work Mon, Tues, Thurs and Friday.
The University of Edinburgh is a charitable body, registered in Scotland, with registration number SC005336.

Appendix 5d: Letter from NHS Research Ethics Service

South East Scotland Research Ethics Service

Deaconess House
148 Pleasance
Edinburgh
EH8 9RS
Tel: 0131 536 9067
Fax: 0131 536 9346

NHS Lothian

Name: Michael Ross
Address: Joint Programme Director
MSc Clinical Education
The Medical Teaching Organisation
The Chancellor's Building
49 Little France Crescent
Edinburgh
EH16 4SB

Date: 11/05/2010
Your Ref:
Our Ref: NR/1005AB4
Enquiries to: Alex Bailey
Extension:
Direct Line: 0131 536 9050
Email: alex.bailey@nhslothian.scot.nhs.uk

Dear Michael,

Full title of project: Learning to teach in the undergraduate medical curriculum: perspectives on appropriate student learning outcomes

You have sought advice from the South East Scotland Research Ethics Service on the above project. This has been considered by the Scientific Officer and you are advised that, based on the submitted documentation (MRoss Ethics May10), it does not need NHS ethical review under the terms of the Governance Arrangements for Research Ethics Committees in the UK. The advice is based on the following:

- *The project is an opinion survey seeking the views of NHS staff on a service development*

If this project is being conducted within NHS Lothian you should inform the relevant local Quality Improvement Team(s).

This letter should not be interpreted as giving a form of ethical approval or any endorsement of the project, but it may be provided to a journal or other body as evidence that ethical approval is not required under NHS research governance arrangements. However, if you, your sponsor/funder or any NHS organisation feels that the project should be managed as research and/or that ethical review by a NHS REC is essential, please write setting out your reasons and we will be pleased to consider further. Where NHS organisations have clarified that a project is not to be managed as research, the Research Governance Framework states that it should not be presented as research within the NHS.

You should retain a copy of this letter with your project file as evidence that you have sought advice from the South East Scotland Research Ethics Service.

Yours sincerely,

A Bailey

Alex Bailey
Scientific Officer
South East Scotland Research Ethics Service

Enclosure: NRES leaflet - "Defining Research"

1

Appendix 6 – Additional data from the FY2 interviews

Appendix 6a – Summary of FY2 interviewee opinions on the list of learning outcomes derived from Round 3 of the Delphi

The number of FY2s who thought each individual learning outcome should be 'Not Core' and 'Core' are indicated in the first and fourth columns respectively. The second and third columns (grey) indicate the number of FY2s who thought, for each item that should be core, that they had 'Not Learned' (NL) or 'Learned' (CL) it themselves during their undergraduate medical education. LO which the majority of FY2s did not think should be core are indicated in bold italics.

LO number		**Not Core (NC)**	Core, Not Learned (NL)	Core and Learned (CL)	**Core (NL + CL)**
1	Recognise the importance of teaching for their profession and practice	-	8	11	**19**
2	Communicate effectively in a teaching context	-	12	7	**19**
3	Recognise and carry out their obligations in relation to teaching and learning	2	11	6	**17**
4	Support and encourage learners	-	9	10	**19**
5	Engage with learners at an appropriate level	-	11	8	**19**
6	Demonstrate appropriate teaching skills	3	13	3	**16**
7	Enthuse and motivate learners	3	9	7	**16**
8	Identify and use informal and unplanned opportunities for teaching	3	9	7	**16**
9	Be creative and resourceful in their teaching approach	4	10	5	**15**
10	Describe what being a teacher means to them	8	9	2	**11**
11	Teach patients	2	3	14	**17**
12	Teach peers / colleagues	3	6	10	**16**
13	Teach medical students	1	6	12	**18**
14	Demonstrate willingness to teach colleagues	3	6	9	**15**
15	Teach more junior trainees	2	9	8	**17**
16	Teach nurses and other healthcare professionals	5	13	1	**14**
17	Mentor more junior trainees	3	11	5	**16**
18	Adopt a learner-centred approach to teaching	4	11	4	**15**
19	Help learners find ways to address their learning needs	3	12	4	**16**
20	Help learners identify their learning needs	3	11	5	**16**
21	Negotiate with students areas to be taught	2	11	6	**17**
22	Facilitate learner self-assessment	4	10	5	**15**
23	Apply their understanding of how individuals learn	3	13	3	**16**
24	Help others undertake self-directed learning	8	7	4	**11**
25	Reflect on their own and others' preferred learning styles	6	7	6	**13**
26	Apply their understanding of educational theory and principles	8	10	1	**11**
27	Describe their own learning style	4	9	6	**15**
28	Adopt a constructivist approach to teaching and learning	7	6	6	**12**
29	Demonstrate clinical skills	-	3	16	**19**
30	Teach practical clinical skills	-	6	13	**19**
31	Teach knowledge-based content	1	5	13	**18**

32	Demonstrate and help learners to develop appropriate attitudes	5	8	6	**14**
33	Teach communication skills	4	10	5	**15**
34	Teach decision-making skills	3	13	3	**16**
35	Respond appropriately to learner questions	-	13	6	**19**
36	Explain concepts effectively	-	10	9	**19**
37	Present information in a structured, logical sequence	-	9	10	**19**
38	Effectively use a range of teaching techniques and strategies	3	11	5	**16**
39	Break down complex topics into learning points	1	10	8	**18**
40	Deal with challenging learner behaviours	6	12	1	**13**
41	Use a range of questioning techniques in their teaching	3	11	5	**16**
42	***Teach using mind maps***	**15**	3	1	4
43	Define learning outcomes / objectives for a teaching session	2	7	10	**17**
44	Evaluate a teaching session	1	11	7	**18**
45	Plan a teaching session	-	14	5	**19**
46	Lead the delivery of a teaching session	-	9	10	**19**
47	Plan and design learning opportunities	5	9	5	**14**
48	Deliver formal planned teaching	1	10	8	**18**
49	Seek participation from all involved in a teaching session	4	5	10	**15**
50	Choose appropriate small group teaching methods	1	10	8	**18**
51	Sequence teaching and learning activities to address learning outcomes	5	9	5	**14**
52	Gain audience participation / interaction in a large group presentation	6	5	8	**13**
53	Deliver one-to-one teaching	2	7	10	**17**
54	Teach in clinical situations	1	10	8	**18**
55	Teach at the bedside	1	7	11	**18**
56	Teach on the ward	1	9	9	**18**
57	Teach in a clinical skills unit	2	7	10	**17**
58	Teach ‘on take’	6	8	5	**13**
59	Teach in outpatient clinics	8	10	1	**11**
60	Lead a small group tutorial	3	9	7	**16**
61	Facilitate experiential and work based learning	4	11	4	**15**
62	Teach effectively in a variety of different situations	5	10	4	**14**
63	Prepare and deliver a presentation or lecture to a large group	2	5	12	**17**
64	Teach in the community	9	9	1	**10**
65	Facilitate a problem based learning tutorial	6	9	4	**13**
66	***Teach in theatre***	**12**	6	1	7
67	***Teach at a distance***	**13**	6	-	6
68	***Organise and run a video or telephone conference***	**15**	4	-	4
69	Assess formatively	3	10	6	**16**
70	Carry out workplace-based assessments	2	8	9	**17**
71	Make a global judgement about performance	5	4	10	**14**
72	Monitor student progress and achievement of learning outcomes	4	10	5	**15**
73	Assess performance using a mark scheme	8	6	5	**11**
74	Assess summatively	7	8	4	**12**
75	***Write assessment questions***	**10**	9	-	9
76	***Examine in an Objective Structured Clinical Examination (OSCE)***	**10**	7	2	9
77	Devise an appropriate assessment for specified learning outcomes	4	13	2	**15**
78	***Assess written work and portfolios***	**12**	6	1	7
79	***Set appropriate assessment standards***	**12**	6	1	7
80	Apply the theory and principles of assessment	6	12	1	**14**
81	Make appropriate use of computers in assessment	9	6	4	**10**
82	***Participate in a formal Board of Examiners***	**18**	1	-	1
83	Assess practical clinical skills	1	6	12	**18**
84	Assess medical students	2	5	12	**17**
85	Assess performance in clinical practice	2	9	8	**17**
86	Assess behaviours	5	6	8	**14**
87	Assess a peer / colleague	5	6	8	**14**
88	Assess attitudes	7	4	8	**12**

89	Assess more junior trainees	1	11	7	**18**
90	Assess knowledge	2	9	8	**17**
91	Assess reflective abilities	7	10	2	**12**
92	Give feedback to their teachers	1	6	12	**18**
93	Give feedback to a learner	-	10	9	**19**
94	Apply the principles of good feedback	1	11	7	**18**
95	Give feedback to their colleagues	3	6	10	**16**
96	Give appropriate academic feedback	1	10	8	**18**
97	Use a variety of techniques & approaches to provide constructive feedback to others	1	14	4	**18**
98	Prepare a PowerPoint presentation	-	1	18	**19**
99	Identify and make use of appropriate resources for particular learning outcomes	1	4	14	**18**
100	Prepare teaching and learning materials	-	7	12	**19**
101	Advise learners on appropriate use of library facilities	7	6	6	**12**
102	Evaluate learning resources	4	9	6	**15**
103	Make appropriate use of learning technology and the internet for teaching	4	2	13	**15**
104	Identify and use multimedia resources in teaching, including images & video	3	4	12	**16**
105	Make appropriate use of clinical simulators	3	4	12	**16**
106	Design effective educational texts including handouts, protocols and study guides	5	11	3	**14**
107	Contribute to the preparation of multimedia learning resources	8	9	2	**11**
108	***Prepare e-learning / online resources***	**10**	7	2	9
109	Prepare a learning plan and timescale	6	7	6	**13**
110	Apply the principles of outcome based education	6	8	5	**13**
111	Select appropriate teaching and learning strategies for given learning outcomes	3	7	9	**16**
112	Develop and negotiate learning outcomes for an educational programme	6	12	1	**13**
113	***Apply the principles of instructional design***	**12**	7	-	7
114	***Apply the principles of curriculum planning and development***	**11**	7	1	8
115	***Design and develop a course or programme of training***	**10**	9	-	9
116	***Implement a planned course or programme of training***	**11**	8	-	8
117	***Select learners for admission to or progression through an educational programme***	**14**	5	-	5
118	Comply with relevant teaching recommendations and requirements	3	10	6	**16**
119	Interpret and comply with relevant training and assessment regulations	4	9	6	**15**
120	Follow relevant grievance and disciplinary procedures with their learners	9	9	1	**10**
121	Teach to institutional goals	6	10	3	**13**
122	Appreciate doctor as manager of teaching including quality control	2	10	7	**17**
123	Appreciate the principles of managing change	7	8	4	**12**
124	Ensure environments are adequate for learning	5	4	10	**14**
125	Manage and support teaching	5	7	7	**14**
126	Develop learning environments and educational facilities	7	8	4	**12**
127	Demonstrate an appreciation and respect for colleagues	-	1	18	**19**
128	Appreciate the benefits of a multi-professional approach to clinical teaching	-	1	18	**19**
129	Adopt a team-based approach to teaching	1	3	15	**18**
130	Contribute to the appraisal of a colleague	3	6	10	**16**
131	Engage in inter-professional teaching	2	7	10	**17**
132	Conduct a formal appraisal of a colleague	3	14	2	**16**
133	Behave appropriately as a role model	-	3	16	**19**
134	Teach in an ethical and professional manner	-	3	16	**19**
135	Demonstrate empathy and respect for learners	-	3	16	**19**
136	Demonstrate appropriate attitudes towards teaching	-	2	17	**19**
137	Achieve an appropriate balance between teaching and other commitments	1	6	12	**18**
138	Seek, receive and act on feedback on their teaching	-	12	7	**19**

139	Identify their strengths and areas for improvement in teaching	-	13	6	**19**
140	Critically reflect and learn from teaching and learning experiences	-	11	8	**19**
141	Take advantage of opportunities to develop their teaching skills	2	7	10	**17**
142	Evaluate and enhance the effectiveness of their teaching	2	8	9	**17**
143	Demonstrate willingness to develop their teaching skills	3	5	11	**16**
144	Engage in continuing professional development as a teacher	1	9	9	**18**
145	Undertake significant event / critical incident analysis in relation to teaching	9	9	1	**10**
146	Keep abreast of new teaching and learning techniques	4	15	-	**15**
147	***Engage in the scholarship of teaching***	**12**	6	1	7
148	Apply the principles of evidence-based medical education	4	3	12	**15**
149	Encourage high quality research in medical education	7	4	8	**12**
150	Appreciate the role of teacher as researcher	5	5	9	**14**
151	***Identify, critique and apply insights from the educational literature***	**10**	4	5	9
152	Be familiar with literature sources on medical education	6	7	6	**13**
153	***Undertake research in medical education***	**13**	5	1	6

Appendix 6b – Teaching undertaken in FY1 by FY2 interviewees

1. Informal opportunistic teaching

Seventeen of the nineteen FY2 doctors interviewed described informal opportunistic teaching they had delivered to medical students whilst in FY1. Informal teaching seemed to occur if learners, typically medical students, were around when FY1s were undertaking their day to day clinical responsibilities and a suitable opportunity arose. As one said, *"Unfortunately it is often a case of just if they happened to be there, and they were looking for some teaching. Because you're so busy as well, you don't have time to sort of actively go and seek the students to teach"* (FY08). They reported that the presence of medical students depended on speciality, location and timing of holidays and other teaching. For example, one said "*My first job was general surgery, and I rarely saw any students around*" (FY10); whilst another said "*In the Borders there were fifth year medical students there, and I would try to occupy them in a fruitful way*" (FY12). FY1s were rarely explicitly told or asked to teach, "*No, the consultants haven't asked me to teach, no*" (FY11); however many of them felt that they were expected to teach, "*I think sometimes it's expected that you'll do it, but you're never explicitly asked to do so*" (FY04). As one put it, "*Well, not so much asked to teach them as 'Here's a medical student, she's going to be with you for the next two weeks'*" (FY08). This seems to be particularly the case during night shifts when there may only be one FY1 working in a particular area, "*I did have some students attached to me sometimes on night shifts... again quite informal teaching, on the hoof*" (FY07). A few also highlighted occasions when they had been asked to teach without prior warning, for example "*Usually at the end of the ward round, yes, sometimes the Registrar would be like… 'Students go with [interviewee] and she'll teach you this'*" (FY09); and "*There were always a lot of students on the ward and we were asked to point out good patients or asked to observe them doing examinations, and that was consultant-led*" (FY09). Generally informal teaching was unplanned and unpredictable, and there was little if any time to prepare, "*So it usually would just be the students on the ward would go with the FY1 and then you'd have to make it up as you go along… So yes, preparation isn't always there, which is a shame because you obviously need that*" (FY09). This might mean that teaching had to be improvised, "*For some of the ad-hoc ones, I wouldn't say I blagged it, but it was very much just racking my brains to answer their questions*" (FY13), and that appropriate resources were not available, "*Unfortunately a lot of the time it's just kind of thrust upon you then and there, so you don't have as much of an opportunity to plan what you're going to teach on, or get the appropriate resources*" (FY08). Desirable 'resources' might mean written information, equipment, patients with appropriate signs and symptoms, or clinical tasks needing done. Interviewees described various ways in which they had tried to improvise with available resources, such as one who let them practise procedures on himself, "*I let them take blood off of me. I don't know whether I should have done that… I've got good veins*" (FY14). None of the interviewees reported having evaluated their informal opportunistic teaching in any systematic way. Any feedback tended to be verbal and informal, such as "*They always said 'Thanks, that was really good'; 'That was really helpful'. But it wasn't as if there was anyone else there observing, or there to give me more feedback than the student*" (FY08).

Five distinct types of informal opportunistic teaching were identified, and these are explored in turn below.

1 a) Involving medical students in day to day practice

The commonest type of FY1 teaching interviewees reported undertaking was to involve medical students in their day-to-day practice (work). Examples could be grouped broadly into encouraging students to follow and observe them, providing a commentary and explanation of practice, responding to student questions, supporting them in difficult or stressful situations, and delegating tasks to students.

i) Encouraging students to follow and observe practice

Many of the teaching activities described by the interviewees began with simply inviting medical students to follow and observe them in their routine work, such as ward rounds "*Getting people to accompany me on ward rounds*" (FY17), or clinical procedures, "*I did have one student come and watch me. I think she'd had a few failures and decided to come and watch me cannulate somebody*" (FY15). Some tried to highlight particular experiences which they thought would be most interesting or educational for the students, "*Like in neurology, there's lots of patients and lots students, and it will be like 'Oh I'm doing a lumbar puncture come and watch', sort of thing*" (FY09). Many interviewees gave the impression that they saw observation as a stepping-stone towards independent practice, "*It's quite helpful to just bring them along when you're doing your gases or cannulas, and just let them observe… So I just bring them along and say 'When you're comfortable we'll do one together and you can give it a shot, but I'll be there in case you need a hand, okay?'*" (FY05).

ii) Providing a commentary and explanation of practice

As well as allowing students to observe, interviewees would often provide a commentary on what they were doing and why. For example one reflected, "*If I had medical students actually based on the ward and following us in the ward round then I would, sort of not necessarily do any formal teaching but you know, mention points here and there as we went along... informing them what to take note of, what not to do*" (FY06). There are a variety of tasks and activities that FY1s would comment upon, ranging from administrative duties to clinical decision-making about diagnosis and patient management, for example "*A couple of times the medical student would sit with me while we chased bloods [results] and we would go through what was abnormal, what could it mean, and what should you do about it*" (FY19).

iii) Responding to student questions

Typically students would also be encouraged to ask the FY1s questions, either about a particular task or situation at the time, "*Maybe on the ward round not understand something, or afterwards ask a question*" (FY18), or later about topics they have been learning about or patients they have encountered, "*They've seen something and they ask you about it*" (FY15). Many interviewees recognised the importance of students being able to ask questions, "*It's good for everyone to be able to just talk through things that are a bit uncertain, or just to be able to clarify things*" (FY05). A number of them mentioned that junior doctors seem less intimidating to ask questions to than seniors, "*You're not very far ahead of them so they don't really see you as somebody to fear, or worry about saying something stupid to*" (FY05), and

also that they may have a stronger rapport, "*Because we're so close in age… it's almost like you're able to establish a bit more of an informal rapport with them*" (FY08).

iv) Supporting students in difficult or stressful situations
One interviewee described a traumatic event in which a patient had suffered a cardiac arrest in front of her and a medical student, and despite resuscitation attempts the patient had died. The interviewee had tried to speak to the student afterwards, "*I did have a chat with her afterwards… I didn't get a massive amount of time I must admit, and that's something that would have been better to do*" (FY15), although they had been limited in that particular situation by time pressures and by finding the situation difficult themselves, recalling "*It was my four weeks into the job so it was pretty scary for both of us… I am sure, aside from the fact that it was quite traumatic, it would have been quite a good learning experience for her*" (FY15). Other interviewees talked about supporting students with less extreme but more common apprehension about working as an FY1, "*They're all quite fearful and they realise that work is on the horizon*" (FY05), and their efforts to encourage them, "*Reassure them that we were in the same position however-many months ago, and we've managed to get along*" (FY18).

v) Delegating tasks or responsibilities to students
A few of the interviewees mentioned delegating tasks to the students, such as cannulation, "*If I got told on the ward round these people need new cannulas, then I would say to the student 'Do you want to have a go?' And to be honest with you it would be quite rare that I'd have a chance to go to the bedside and stand there and watch them because I'd have a million other jobs to do*" (FY15). Others highlighted the need to only delegate tasks which the student could comfortably do, "*I'd try and let them get as stuck in as possible, [but] don't push them beyond where they feel comfortable*" (FY18), with one reflecting on how they had felt being given similar tasks as a student, "*I certainly found in medical school if I was asked to do something that I didn't feel confident in I would really panic*" (FY05).

1 b) Getting medical students to see patients on their own

Almost all of the interviewees reported having helped medical students find patients to see, even if they did not identify this as teaching. Many had also asked students to see patients and then come and report or discuss their findings.

i) Finding patients for students to see
Most interviewees had been approached by medical students to help them find patients to see on their own, often asking for patients with particular clinical signs or symptoms, "*They came and asked, 'Are there any patients who've got this murmur or such and such? We're talking about this, is there anyone we can go and listen to?*" (FY16). Some had also pointed-out interesting patients to students who happen to be around on the ward, either on their own initiative or because they had been asked to by their seniors, "*There were always a lot of students on the ward and we were asked to point out good patients*" (FY09).

ii) Getting students to 'clerk' and present patients
Many interviewees also said they would ask students to report back to them about patients they had seen afterwards, "*I asked them to take histories and examine*

patients and present those patients to me and then gave them feedback on how they were doing that" (FY12). This seemed to be particularly common in admissions units where students could more formally 'clerk' a patient (typically taking a history, a relevant physical examination, considering differential diagnosis and management, and writing brief notes) and then present their findings to the FY1, "*It tended to be more in the admissions unit that students liked to come to get their clerking, they had so many clerkings to do in an allocated time, so they come*" (FY11).

1 c) Observing or testing medical students and giving feedback

Many interviewees had also identified or created additional opportunities for medical students to practise their skills, over and above those resulting directly from day to day tasks. These could be grouped as 'bedside teaching', supervising students doing clinical procedures, and testing knowledge and clinical reasoning.

i) 'Bedside teaching'

Many interviewees mentioned that they had delivered what they referred to as 'Bedside teaching' in FY1, "*We did a lot of bedside teaching and rehearsing neurological examinations*" (FY17). Others described similar activities in which they had observed and given formative feedback on students taking a history or examining patients, "*Watch them examine a patient and then give them feedback on what they did*" (FY01). Sometimes this would be with individual students and at other times with small groups. Generally the interviewees said they had a good idea of the level of competence they expected students to demonstrate in examination skills, and they felt confident giving students feedback on their skills, "*I brought two or three students to one of my patients and just… went through the cardiovascular examination with them… Essentially it was one student examining with the other two watching and me going through it with them*" (FY06). Sometimes they had based the format and level of their bedside teaching on a particular assessment, "*The bedside teaching I've done, I would consider that mostly to be examination skills... as if it were being done for a university OSCE [Objective Structured Clinical Examination] exam*" (FY16).

ii) Supervising students doing clinical procedures

Most interviewees talked about helping students gain confidence doing practical clinical procedures with patients. One said, "*The only teaching I really did in F1 was with medical students attached to the ward. Mainly practical procedures. Things like how to take blood; how to put a Venflon [cannula] in; how to do an ABG [Arterial Blood Gas]; and then interpreting blood results*" (FY19). In some cases this involved direct supervision or observation, "*I supervised them undertaking basic clinical skills such as cannulation*" (FY12), or just being around for reassurance, "*They might want me to come and see them take blood, or just come – so that there's someone else there in case anything goes wrong*" (FY11). For some they would only get involved if the student had failed, "*It would be quite rare that I'd have a chance to go to the bedside and stand there and watch them… but if they didn't get it then I'd quite happily go*" (FY15). Others wanted to watch at least the first time, "*If they say they can put a cannula in I prefer to at least watch them do it first time round, so I make sure they definitely know what they're doing. Because I think that students sometimes are quite afraid of saying if they don't know something*" (FY17).

iii) Testing knowledge and clinical reasoning

Interviewees described testing students by asking knowledge-based questions relating to patients they have seen, "Y*ou can explain this case and ask them questions and see if they know about it*" (FY15). Others described testing students' clinical diagnostic reasoning, judgement or patient management skills, "*Sometimes I'd get them to do more formal assessments for me and then go back and check, and go through clinical judgement scenarios, and go through differential diagnoses and treatments and things like that*" (FY07). One interviewee described going back with students to see a patient they had seen to show them things they had missed, "*It's quite nice for them to go and see a patient they had on the ward, with good clinical signs or history or whatever, and then come and present it back to you; and then you can go and see them together and point out something that they hadn't looked for or missed*" (FY08).

1 d) Giving medical students opportunistic 'mini tutorials'

Many interviewees described occasions where, time permitting, they would give one or more medical students brief tutorials on topics arising from a ward round or other aspects of practice, "*Like how to manage somebody with acute pulmonary oedema, I just did it there, standing there outside one of the bays and just spoke to them for, what, fifteen minutes about it*" (FY06). Sometimes these opportunistic tutorials had taken place in situ, and other times the interviewee had sought to move somewhere more appropriate for teaching. The content of such tutorials would be opportunistic, generally focussing on topics or questions from practice, "*Maybe on the ward round not understand something, or afterwards ask a question. And as long as the ward was quiet, one of us could normally nip away and do a quick on-the-spot half hour chat on a subject matter*" (FY18). Other times the topics might arise from patients the students had seen themselves, "*I got them to go off and see patients by themselves, present back to me, and then they could have a little sort of mini tutorial on whichever subject it was*" (FY08). Sometimes these opportunistic mini tutorials focused on clinical procedures such as cannulation, as one interviewee described, "*I took a group of them through to the treatment room to demonstrate what you actually do with a Venflon, and talked them through it to remind them of it, and then do the same thing again with patients... and then also when they were happy to do it themselves they did it, and most of them got it absolutely fine. If not, I always had a pair of gloves on in case I needed to reposition it, to get it in for them*" (FY16).

1 e) Teaching doctors at the same or higher level

A number of interviewees mentioned teaching their peers, "*There's always day to day teaching and sharing experiences I suppose, yes there's always a constant element of teaching really when you work in a team, with your peers and your seniors*" (FY07). One interviewee described assisting and teaching more senior maxillofacial Specialist Trainees ('Senior House Officers') in FY1 who had been trained in dentistry rather than medicine, "*Lots of them are trained dentists but not trained doctors, but technically my senior. They'd be Senior House Officers when I was an FY1, and a lot of the time I would go through the basics of ECGs with them, and quite basic medical problems that they hadn't really come across before… just going through the basics of what's relevant to that patient and how you might go about managing it*" (FY07). One interviewee also mentioned being asked to submit a written evaluation of a consultant in preparation for appraisal, "*I suppose I have done Mini-PATs [Mini Peer Assessment Tool] for one of my consultants, so I suppose that is kind of appraisal and feedback*" (FY15).

1 f) Teaching nurses and nursing students

One interviewee mentioned teaching nursing students during FY1. They seemed to consider this as largely similar to teaching medical students, "*Mainly teaching students, either nursing students or medical students on the ward, either doing procedures or just going over certain concepts*" (FY05). Another interviewee described teaching qualified nurses, and again considered this to be similar to teaching medical students, "*Yeah, very similar. I suppose ECG interpretation is quite a good example of that. I've done that probably at some point with most nurses on most of my jobs I've gone through at some point. Just if you've got a spare moment and you happen to see a good ECG you would show a nurse... and x-ray interpretation actually. There were always lots of really good x-rays in my cardiothoracic job, my second job, and I would often go through that with nurses or they would ask me… I don't think I ever did it with nursing students actually, I think it was only ever qualified nurses*" (FY07).

2. Semi-formal pre-arranged teaching

Many of the interviewees had also been involved in teaching which was pre-arranged, although not necessarily formally structured or timetabled. Their examples can be grouped as student 'shadowing' placements, pre-arranged topic-based tutorials, hosting school pupils for work experience, and teaching for societies and friends outside of work.

2 a) Having students on 'shadowing' placements

Most of the interviewees described having had students 'shadowing' them. This involved medical students being attached to them individually as an FY1 or to their team for between one (Edinburgh students) and four (Dundee students) weeks. As one explained, "*In Dundee we have this shadowing, like there's two blocks of four weeks, so as a Foundation doctor you know that you're going to have the same student with you for four weeks and that they're shadowing you. So you know you've got that time and that is part of your role*" (FY09). This extra time and continuity allowed interviewees to better get to know students' learning needs and to plan teaching amongst other commitments, "*You can develop something over the next few weeks… maybe if you compromise and say, 'well tomorrow I'll set aside this time and we can do that'*" (FY09). Students would follow them and learn about the FY1 role, "*They're literally just following round the FY1s and working out the job and what it entails. So by them following us and asking questions on the job*" (FY18). Shadowing took place towards the end of the undergraduate curriculum and focused more on administrative tasks and time-management than clinical procedures, "*Mainly showing them how the ward worked and, on a practical day to day basis, how you got through all the jobs. So taking them through what I would do in a normal day. Tricks that I had found helped me to get things done more efficiently. Specific things about different consultants that were useful to know. Not so much the practical stuff because hopefully by then they could take bloods and do Venflons and things, but more of what things to prioritise and how to get it done effectively*" (FY19). One interviewee talked about preparing students to manage more complex and acutely unwell patients, "*Where possible if there was somebody that was not very well we would ask the students if they wanted to go and assess the patient. Most of the time if they were unwell, you know, we'd go along with them and watch them*

do it… but started to try and get them to think about what they were going to do when they were F1's and how they would go about assessing and treating somebody that wasn't well" (FY13). As with informal teaching they would delegate clinical tasks, but interviewees also mentioned involving shadowing students in decision making, "*Not just following around, doing things. So it was quite handy for people like me who've come from elsewhere and aren't entirely sure where this random test goes… Somebody you can bounce ideas off as well*" (FY18), and encouraging them to practise the FY1 role, "*So you shadow the FY1 and then hopefully by the end you'll be doing the writing in the notes, or doing the bloods, or just doing their job*" (FY09).

2 b) Pre-arranged topic or case based tutorials

A number of the interviewees described tutorials they had pre-arranged with students to give themselves time to prepare, "*I found sometimes I am able to teach a little bit on that subject that day, but more often I say 'Okay, well what we'll do is we'll arrange this time in a day or two just to give me a bit of time to prepare properly for it*" (FY05). Such preparation was typically knowledge-based, "*Not like in a presentation or anything as formal as that, but just it's always good to go and read a chapter of the book before you sort of claim to have more knowledge about it than them*" (FY08). Interviewees described a wide range of topics for such pre-arranged tutorials, including clinical presentations, "*I did sessions about delirium and deliberate self harm*" (FY17), interpretation of results "*We did a session on ECGs; chest x-rays; abdominal films; ABGs*" (FY17), and the management of common conditions, "*We talked through various conditions – asthma for example: how the patient might present, what the worrying signs were… and what your immediate management would be… Then we got out Kardexes [prescription charts] and went through the Kardex and practised prescribing nebulisers and oxygen and steroids and various things like that*" (FY13). Often these tutorials would be arranged for times when the FY1 was not officially working. One interviewee had even arranged a series of such tutorials in their own time, "*The day job didn't really afford very much time in terms of getting stuff done during the day… so I did either a session at 8 or 5, probably once to twice a week"* (FY17). Some of these tutorials were evaluated, "*I did evaluation sheets. I adapted the ones I had from the prescribing tutorials*" (FY17), but many were not, "*I kept meaning to send round…even feedback forms. Just simple feedback forms to show that I'd done it, but it was coming up to their Finals and I never quite got them all to fill in the forms unfortunately*" (FY13).

2 c) Hosting school pupils for work experience

One interviewee had volunteered to take school pupils with them on the ward for work experience as part of a local organised scheme, "*So I think over two weeks they would come with me for a couple of hours in the morning and a couple of hours in the afternoon… I talked to them about what my role was as a junior doctor and about the process of medical school… That was something we signed up for, but quite a lot of people did that*" (FY09). None of the other interviewees mentioned involvement in similar activities.

2 d) Teaching for societies and friends outside work

Two interviewees mentioned pre-arranged teaching that they had undertaken in FY1 outside of their workplace. One was for an student society of which they had been a member, "*Well, I taught at the Edinburgh Surgical Society to undergraduates a few*

times and that was tutorials" (FY04). The other was for friends in the year below who had not yet graduated, "*I spent a lot of last year going through teaching similar scenarios with my friends who were just about to do finals… so we did academic stuff, we would do prescribing and common medical emergencies that would come up in the written exams. But then I spent loads of time with them going through examinations and thinking up scenarios and doing histories*" (FY07).

3. Formal organised teaching

Some of the teaching that interviewees had delivered was formally organised as part of the undergraduate medical curriculum or was explicitly required of them in FY1 as part of their job. More than half of the interviewees described having been involved in the Foundation Doctor Teaching Scheme in FY1. Some described covering teaching if seniors were unavailable, helping to deliver clinical procedure teaching, giving presentations, organising teaching and providing learning resources.

3 a) Tutoring as part of the 'Foundation Doctor Teaching Scheme'

Twelve of the nineteen interviewees said they had each delivered between one and ten hour-long tutorials, mostly on prescribing, to medical students as part of the 'South East Scotland Foundation Doctor Teaching Scheme'. As one interviewee explained, "*It's a programme that's meant to complement the formal teaching that the third year students get on pharmacology… a series of six tutorials that are delivered by foundation doctors to third year medical students. We managed to deliver these tutorials to about a hundred people or so… and the feedback data that we've got from them is quite encouraging*" (FY04). Individuals chose different topics from the six available, "*I did shortness of breath tutorials, and because I was working on respiratory at the time I felt that was a subject I was quite confident on*" (FY11), or opted to tutor multiple topics, "*I've been involved in the Year 3 prescribing programme, and started teaching from about October 2009. Teaching small group prescribing tutorials. So probably did about 8 to 10 sessions last year, from Tutorial 1 right through to Tutorial 6*" (FY17). Sessions generally involved a PowerPoint presentation, discussion around clinical scenarios, and practice prescribing on drug charts. Some described presenting the material roughly as it was given to them, "*I delivered a PowerPoint presentation that was prepared actually not by me… to third year medical students*" (FY12). Others had personalised the pre-prepared content and tried to make it more useful for the students, "*Not just the standard going through point by point, but just trying to sort of mix it up a little bit, and asking them to think about what's really important rather than going through the answers one by one*" (FY06). Many of them mentioned how much they enjoyed this teaching, "*So I really enjoyed it and I got really good feedback from the students about it as well*" (FY06). Most had attended a one-day training course prior to delivering this teaching, "*I sort of got involved at the beginning of FY1. I went to the workshop*" (FY08). Some also talked about what they had learned from the training and from delivering the teaching, "*Learning how not to basically just give a lecture, trying to make it interactive. And learning how to encourage people… or explain things in a way that doesn't make them feel awful for not having known the answer... Also dealing with the… ones that are more outspoken. Trying to recognise them and involve them but not let them overshadow some of the shyer students*" (FY15).

3 b) Covering timetabled tutorials if seniors unavailable

Two interviewees described delivering formal timetabled teaching for medical students, which they had covered at short notice when a senior colleague was unavailable. One explained this was because they remember how it felt as a medical student when teaching had been cancelled, "*A lot of being a medical student is kind of hanging around, and sometimes people will not turn up to teach you*" (FY08). This seemed to be particularly challenging if they were not briefed about the teaching in advance, "*In plastic surgery the F2s, our F2s, were meant to teach medical students… but they were always busy in theatre and they were on-call as well in A&E checking over referrals and stuff. So there was a couple of occasions I had to kind of just wing it with them… the first one I probably spent half the session trying to work out what level they were at, not having any knowledge of their undergraduate curriculum and not knowing what they were expecting. And not being able to chat to the F2, because they were in theatre, to find out what they normally delivered. So the first one was probably a bit of a shambles. But after that, the second one was okay*" (FY18).

3 c) Formal timetabled teaching of clinical procedures

One interviewee described formal timetabled urinary catheter teaching which they had delivered on a weekly basis, "*During a urology job last year. One of the FY1s was expected to give a tutorial about catheterisation once a week to the medical students who were attached, and I enjoyed it and would volunteer for that more often than not… Over the weeks and the months I got to the stage where I had my hour long tutorial. I had a, kind of, pattern for it and I know what I was going to ask and what I was going to tell them… it started to feel quite natural towards the end of the rotation*" (FY14). This was one of the few examples of FY1 teaching which was expected as part of their job. Preparation had consisted solely of receiving a similar tutorial from their seniors at the start of their job, "*There's a different set of students every week and one of the first things they get on the Monday morning is their catheter tutorial, and that first Monday that we'd started, so we'd been doing the job four days, someone had to do it. So I went along and did that and yeah – it was quite nerve wracking at first, especially since at that time I hadn't put that many catheters in real people and had to have the same tutorial myself by one of the registrars*" (FY14). Another interviewee, working in the same rotation as FY14, reported having a similar opportunity but choosing not to take it up, "*I never actually did it… One of the other F1s actually quite enjoyed it and he did actually prepare quite a good session that he liked to do… but I know that in previous blocks everyone's done it*" (FY09). Several interviewees also mentioned that FY1 doctors had, for the first time this year, been invited by University of Edinburgh staff to volunteer to help with formal timetabled clinical procedures teaching on venepuncture, cannulation and airway management in a Clinical Skills Centre. Three of them had now taken up this opportunity in FY2, but they were aware of at least one FY1 who was also helping with these this year.

3 d) Giving presentations

Many interviewees mentioned giving presentations at clinical department meetings in FY1, "*I suppose I've taught at departmental meetings, just by me presenting a case that I've also done some background research about. Or presented things that related to an audit that's been done in the department*" (FY16). Not all of them considered such presentations as a form of teaching however, "*Things like audits we*

were involved with, but that was local presentations you'd be doing to present the findings of the audit" (FY03).

3 e) Organising teaching

As well as organising their own time and teaching, some interviewees also mentioned organisation or coordination of teaching delivered by others. This included local negotiations amongst FY1 doctors regarding who would teach, such as one example in which another doctor did not want a student to shadow them, "*They weren't particularly keen to have somebody following them around… They felt kind of under pressure and a bit stressed… We all came in at the same time in the morning, and we just had a quick chat with the doctor… and they just asked if… one of the other free doctors would mind taking someone on and it wasn't an issue straight away*" (FY18). Several interviewees described more formal organisational roles, particularly in relation to the South East Scotland Foundation Doctor Teaching Scheme, "*Last year I organised the year three prescribing tutorials and spent a long time organising it and writing teaching material, but in the end I was only able to teach one or two of the sessions myself*" (FY02).

3 f) Identifying or creating learning resources

Some interviewees described identifying or creating teaching materials. This ranged from identifying interesting ECGs (Electrocardiographs) or x-rays, "*You happen to see a good ECG you would show a nurse*" (FY07), to writing clinical scenarios and other teaching materials as in the quote from FY02 above. Two others were still working on projects they had started in FY1. The first was developing a website, "*We're trying to put a website together in order to facilitate connecting Foundation doctors that want to teach with students that want to learn. And so I envisage there being a website whereby doctors can look to find out a, how to learn about teaching, what teaching itself means and what resources there are available to develop your teaching*" (FY01). The second was helping to write online tutorials for medical students, "*I'm involved in a project for writing some online tutorials for the fourth year [intranet] pages for Obs and Gynae… the topic is an appointment at the GUM clinic… presenting with the 6 main things that come up in the learning objectives... I suppose a classical textbook example of how a patient might present, and how you might treat them*" (FY16).

Appendix 7 – Additional data from the student focus groups

Appendix 7a – Summary of student opinions on the list of learning outcomes derived from Round 3 of the Delphi

The number of medical student participants who thought each LO should be 'Not Core' and 'Core' are indicated in the first and fourth columns respectively. The second and third columns (grey) indicate the number of medical students who thought, for each item that should be core, that they had 'Not Learned' (NL) or 'Learned' (CL) it themselves during their undergraduate medical education to date. LO which the majority thought should not be core are indicated in bold italics, and those for which equal numbers thought it should be core and not core are indicated in (non-bold) italics.

LO number		Not Core (NC)	Core, Not Learned (NL)	Core and Learned (CL)	**Core (NL + CL)**
1	Recognise the importance of teaching for their profession and practice	-	-	12	**12**
2	Communicate effectively in a teaching context	-	2	10	**12**
3	Recognise and carry out their obligations in relation to teaching and learning	1	3	8	**11**
4	Support and encourage learners	-	2	10	**12**
5	Engage with learners at an appropriate level	-	3	9	**12**
6	Demonstrate appropriate teaching skills	-	4	6	**10**
7	Enthuse and motivate learners	-	7	5	**12**
8	Identify and use informal and unplanned opportunities for teaching	-	6	6	**12**
9	Be creative and resourceful in their teaching approach	-	6	6	**12**
10	Describe what being a teacher means to them	5	3	3	**6**
11	Teach patients	1	-	11	**11**
12	Teach peers / colleagues	-	1	11	**12**
13	Teach medical students	-	1	11	**12**
14	Demonstrate willingness to teach colleagues	1	2	9	**11**
15	Teach more junior trainees	-	6	6	**12**
16	Teach nurses and other healthcare professionals	1	7	4	**11**
17	Mentor more junior trainees	-	7	5	**12**
18	Adopt a learner-centred approach to teaching	1	7	4	**11**
19	Help learners find ways to address their learning needs	1	8	3	**11**
20	Help learners identify their learning needs	-	9	3	**10**
21	Negotiate with students areas to be taught	2	4	6	**10**
22	Facilitate learner self-assessment	3	6	3	**9**
23	Apply their understanding of how individuals learn	4	3	5	**8**
24	*Help others undertake self-directed learning*	6	1	5	6
25	Reflect on their own and others' preferred learning styles	2	3	7	**10**
26	*Apply their understanding of educational theory and principles*	6	5	1	6
27	Describe their own learning style	4	1	7	**8**
28	Adopt a constructivist approach to teaching and learning	3	3	6	**9**
29	Demonstrate clinical skills	-	1	11	**12**
30	Teach practical clinical skills	-	1	11	**12**

31	Teach knowledge-based content	-	-	12	**12**
32	Demonstrate and help learners to develop appropriate attitudes	3	3	6	**9**
33	Teach communication skills	1	5	6	**11**
34	Teach decision-making skills	-	8	4	**12**
35	Respond appropriately to learner questions	1	4	7	**11**
36	Explain concepts effectively	-	4	8	**12**
37	Present information in a structured, logical sequence	-	2	10	**12**
38	Effectively use a range of teaching techniques and strategies	-	6	6	**12**
39	Break down complex topics into learning points	-	5	7	**12**
40	Deal with challenging learner behaviours	3	7	2	**9**
41	Use a range of questioning techniques in their teaching	3	4	5	**9**
42	***Teach using mind maps***	**7**	1	4	5
43	Define learning outcomes / objectives for a teaching session	-	3	9	**12**
44	Evaluate a teaching session	1	4	7	**11**
45	Plan a teaching session	-	5	7	**12**
46	Lead the delivery of a teaching session	1	4	7	**11**
47	Plan and design learning opportunities	1	6	5	**11**
48	Deliver formal planned teaching	1	2	9	**11**
49	Seek participation from all involved in a teaching session	-	3	9	**12**
50	Choose appropriate small group teaching methods	1	6	5	**11**
51	Sequence teaching and learning activities to address learning outcomes	2	5	5	**10**
52	Gain audience participation / interaction in a large group presentation	3	3	6	**9**
53	Deliver one-to-one teaching	1	1	10	**11**
54	Teach in clinical situations	-	1	11	**12**
55	Teach at the bedside	1	2	9	**11**
56	Teach on the ward	-	1	11	**11**
57	Teach in a clinical skills unit	2	1	9	**10**
58	Teach 'on take'	4	6	2	**8**
59	Teach in outpatient clinics	3	5	4	**9**
60	Lead a small group tutorial	-	1	11	**12**
61	Facilitate experiential and work based learning	5	4	3	**7**
62	Teach effectively in a variety of different situations	-	6	6	**12**
63	Prepare and deliver a presentation or lecture to a large group	-	1	11	**12**
64	Teach in the community	4	3	5	**8**
65	Facilitate a problem based learning tutorial	3	7	2	**9**
66	Teach in theatre	5	6	1	**7**
67	***Teach at a distance***	**9**	2	1	3
68	***Organise and run a video or telephone conference***	**7**	4	1	5
69	Assess formatively	1	6	5	**11**
70	Carry out workplace-based assessments	2	8	2	**10**
71	Make a global judgement about performance	1	5	6	**11**
72	Monitor student progress and achievement of learning outcomes	2	7	3	**10**
73	Assess performance using a mark scheme	2	3	7	**10**
74	Assess summatively	1	7	4	**11**
75	***Write assessment questions***	**8**	3	1	4
76	Examine in an Objective Structured Clinical Examination (OSCE)	4	4	4	**8**
77	***Devise an appropriate assessment for specified learning outcomes***	**6**	2	3	5
78	***Assess written work and portfolios***	**8**	3	-	3
79	***Set appropriate assessment standards***	**7**	4	-	4
80	Apply the theory and principles of assessment	5	5	1	**6**
81	Make appropriate use of computers in assessment	5	5	1	**6**
82	***Participate in a formal Board of Examiners***	**9**	3	-	3
83	Assess practical clinical skills	-	5	7	**12**
84	Assess medical students	1	5	6	**11**
85	Assess performance in clinical practice	-	5	7	**12**
86	Assess behaviours	1	5	6	**11**
87	Assess a peer / colleague	1	2	9	**11**

88	Assess attitudes	1	6	5	**11**
89	Assess more junior trainees	1	5	6	**11**
90	Assess knowledge	-	3	9	**12**
91	Assess reflective abilities	4	4	4	**8**
92	Give feedback to their teachers	-	1	11	**12**
93	Give feedback to a learner	-	1	11	**12**
94	Apply the principles of good feedback	-	6	6	**12**
95	Give feedback to their colleagues	-	2	10	**12**
96	Give appropriate academic feedback	1	6	5	**11**
97	Use a variety of techniques & approaches to provide constructive feedback to others	1	6	5	**11**
98	Prepare a PowerPoint presentation	-	-	12	**12**
99	Identify and make use of appropriate resources for particular learning outcomes	-	1	11	**12**
100	Prepare teaching and learning materials	-	1	11	**12**
101	Advise learners on appropriate use of library facilities	4	3	5	**8**
102	Evaluate learning resources	2	2	8	**10**
103	Make appropriate use of learning technology and the internet for teaching	3	-	9	**9**
104	Identify and use multimedia resources in teaching, including images & video	1	2	8	**10**
105	Make appropriate use of clinical simulators	4	3	5	**8**
106	*Design effective educational texts including handouts, protocols and study guides*	6	2	4	6
107	*Contribute to the preparation of multimedia learning resources*	6	2	4	6
108	***Prepare e-learning / online resources***	**7**	2	3	5
109	Prepare a learning plan and timescale	3	3	6	**9**
110	*Apply the principles of outcome based education*	6	1	5	6
111	Select appropriate teaching and learning strategies for given learning outcomes	3	2	7	**9**
112	***Develop and negotiate learning outcomes for an educational programme***	**7**	3	2	5
113	***Apply the principles of instructional design***	**7**	4	1	5
114	***Apply the principles of curriculum planning and development***	**7**	4	1	5
115	***Design and develop a course or programme of training***	**8**	3	1	4
116	***Implement a planned course or programme of training***	**7**	3	2	5
117	***Select learners for admission to or progression through an educational programme***	**9**	2	1	3
118	Comply with relevant teaching recommendations and requirements	-	5	7	**12**
119	Interpret and comply with relevant training and assessment regulations	-	6	6	**12**
120	Follow relevant grievance and disciplinary procedures with their learners	2	7	3	**10**
121	Teach to institutional goals	3	6	3	**9**
122	Appreciate doctor as manager of teaching including quality control	2	8	2	**10**
123	Appreciate the principles of managing change	4	6	2	**8**
124	Ensure environments are adequate for learning	4	3	5	**8**
125	Manage and support teaching	2	7	3	**10**
126	***Develop learning environments and educational facilities***	**7**	3	2	5
127	Demonstrate an appreciation and respect for colleagues	-	-	12	**12**
128	Appreciate the benefits of a multi-professional approach to clinical teaching	-	-	12	**12**
129	Adopt a team-based approach to teaching	-	1	11	**12**
130	Contribute to the appraisal of a colleague	1	3	8	**11**
131	Engage in inter-professional teaching	1	1	10	**11**
132	Conduct a formal appraisal of a colleague	2	6	4	**10**
133	Behave appropriately as a role model	-	1	11	**12**
134	Teach in an ethical and professional manner	-	1	11	**12**
135	Demonstrate empathy and respect for learners	-	-	12	**12**
136	Demonstrate appropriate attitudes towards teaching	-	-	12	**12**
137	Achieve an appropriate balance between teaching and other commitments	-	2	10	**12**

138	Seek, receive and act on feedback on their teaching	-	1	11	**12**
139	Identify their strengths and areas for improvement in teaching	-	1	11	**12**
140	Critically reflect and learn from teaching and learning experiences	-	1	11	**12**
141	Take advantage of opportunities to develop their teaching skills	-	4	8	**12**
142	Evaluate and enhance the effectiveness of their teaching	-	3	9	**12**
143	Demonstrate willingness to develop their teaching skills	1	-	11	**11**
144	Engage in continuing professional development as a teacher	1	1	10	**11**
145	Undertake significant event / critical incident analysis in relation to teaching	3	4	5	**9**
146	Keep abreast of new teaching and learning techniques	5	4	3	**7**
147	***Engage in the scholarship of teaching***	**7**	4	1	5
148	Apply the principles of evidence-based medical education	3	1	8	**9**
149	Encourage high quality research in medical education	2	4	6	**10**
150	Appreciate the role of teacher as researcher	3	2	7	**9**
151	*Identify, critique and apply insights from the educational literature*	6	2	4	6
152	Be familiar with literature sources on medical education	2	6	4	**10**
153	***Undertake research in medical education***	**7**	2	3	5

Appendix 7b – Comparison of student opinions on the list of learning outcomes between the three focus groups

Summary of medical student opinions on the list of learning outcomes derived from Round 3 of the Delphi, presented as averages for each focus group and then the average of all medical student responses. Learning outcomes which the majority of medical students thought should be core are indicated by a tick ('✓') irrespective of whether they thought they had learned it or not. Those which the majority thought should not be core are indicated by a cross ('X') and are shaded grey. Learning outcomes which an even number of students thought should be core or not are indicated by a circle ('o').

LO number		FG – 1 Organisers	FG – 2 Tutors	FG – 3 No PAL	**3 Focus Groups Combined**
1	Recognise the importance of teaching for their profession and practice	✓	✓	✓	✓
2	Communicate effectively in a teaching context	✓	✓	✓	✓
3	Recognise and carry out their obligations in relation to teaching and learning	✓	✓	✓	✓
4	Support and encourage learners	✓	✓	✓	✓
5	Engage with learners at an appropriate level	✓	✓	✓	✓
6	Demonstrate appropriate teaching skills	✓	✓	✓	✓
7	Enthuse and motivate learners	✓	✓	✓	✓
8	Identify and use informal and unplanned opportunities for teaching	✓	✓	✓	✓
9	Be creative and resourceful in their teaching approach	✓	✓	✓	✓
10	Describe what being a teacher means to them	✓	✓	X	✓
11	Teach patients	✓	✓	✓	✓
12	Teach peers / colleagues	✓	✓	✓	✓
13	Teach medical students	✓	✓	✓	✓
14	Demonstrate willingness to teach colleagues	✓	✓	✓	✓
15	Teach more junior trainees	✓	✓	✓	✓
16	Teach nurses and other healthcare professionals	✓	✓	✓	✓
17	Mentor more junior trainees	✓	✓	✓	✓

18	Adopt a learner-centred approach to teaching	✓	✓	✓	✓
19	Help learners find ways to address their learning needs	✓	✓	✓	✓
20	Help learners identify their learning needs	✓	✓	✓	✓
21	Negotiate with students areas to be taught	✓	✓	✓	✓
22	Facilitate learner self-assessment	✓	✓	✓	✓
23	Apply their understanding of how individuals learn	✓	x	✓	✓
24	Help others undertake self-directed learning	✓	x	x	o
25	Reflect on their own and others' preferred learning styles	✓	✓	✓	✓
26	Apply their understanding of educational theory and principles	✓	x	✓	o
27	Describe their own learning style	✓	✓	✓	✓
28	Adopt a constructivist approach to teaching and learning	✓	✓	✓	✓
29	Demonstrate Clinical skills	✓	✓	✓	✓
30	Teach practical Clinical skills	✓	✓	✓	✓
31	Teach knowledge-based content	✓	✓	✓	✓
32	Demonstrate and help learners to develop appropriate attitudes	✓	✓	x	✓
33	Teach communication skills	✓	✓	✓	✓
34	Teach decision-making skills	✓	✓	✓	✓
35	Respond appropriately to learner questions	✓	✓	✓	✓
36	Explain concepts effectively	✓	✓	✓	✓
37	Present information in a structured, logical sequence	✓	✓	✓	✓
38	Effectively use a range of teaching techniques and strategies	✓	✓	✓	✓
39	Break down complex topics into learning points	✓	✓	✓	✓
40	Deal with challenging learner behaviours	✓	✓	✓	✓
41	Use a range of questioning techniques in their teaching	✓	✓	✓	✓
42	Teach using mind maps	o	✓	x	x
43	Define learning outcomes / objectives for a teaching session	✓	✓	✓	✓
44	Evaluate a teaching session	✓	✓	✓	✓
45	Plan a teaching session	✓	✓	✓	✓
46	Lead the delivery of a teaching session	✓	✓	✓	✓

47	Plan and design learning opportunities	✓	✓	✓	✓
48	Deliver formal planned teaching	✓	✓	✓	✓
49	Seek participation from all involved in a teaching session	✓	✓	✓	✓
50	Choose appropriate small group teaching methods	✓	✓	✓	✓
51	Sequence teaching and learning activities to address learning outcomes	✓	✓	✓	✓
52	Gain audience participation / interaction in a large group presentation	✓	✓	✓	✓
53	Deliver one-to-one teaching	✓	✓	✓	✓
54	Teach in clinical situations	✓	✓	✓	✓
55	Teach at the bedside	✓	✓	✓	✓
56	Teach on the ward	✓	✓	✓	✓
57	Teach in a clinical skills unit	✓	✓	✓	✓
58	Teach 'on take'	✓	✓	x	✓
59	Teach in outpatient clinics	✓	✓	x	✓
60	Lead a small group tutorial	✓	✓	✓	✓
61	Facilitate experiential and work based learning	o	✓	x	✓
62	Teach effectively in a variety of different situations	✓	✓	✓	✓
63	Prepare and deliver a presentation or lecture to a large group	✓	✓	✓	✓
64	Teach in the community	✓	✓	x	✓
65	Facilitate a problem based learning tutorial	x	✓	✓	✓
66	Teach in theatre	o	✓	x	✓
67	Teach at a distance	x	✓	x	x
68	Organise and run a video or telephone conference	x	x	✓	x
69	Assess formatively	✓	✓	✓	✓
70	Carry out workplace-based assessments	✓	✓	x	✓
71	Make a global judgement about performance	✓	✓	✓	✓
72	Monitor student progress and achievement of learning outcomes	✓	✓	✓	✓
73	Assess performance using a mark scheme	✓	✓	✓	✓
74	Assess summatively	✓	✓	✓	✓
75	Write assessment questions	o	x	x	x

76	Examine in an Objective Structured Clinical Examination (OSCE)	✓	x	✓	✓
77	Devise an appropriate assessment for specified learning outcomes	✓	x	x	o
78	Assess written work and portfolios	✓	x	x	x
79	Set appropriate assessment standards	✓	x	x	x
80	Apply the theory and principles of assessment	✓	x	✓	✓
81	Make appropriate use of computers in assessment	✓	x	✓	✓
82	Participate in a formal Board of Examiners	✓	x	x	x
83	Assess practical clinical skills	✓	✓	✓	✓
84	Assess medical students	✓	✓	✓	✓
85	Assess performance in clinical practice	✓	✓	✓	✓
86	Assess behaviours	✓	✓	✓	✓
87	Assess a peer / colleague	✓	✓	✓	✓
88	Assess attitudes	✓	✓	✓	✓
89	Assess more junior trainees	✓	✓	✓	✓
90	Assess knowledge	✓	✓	✓	✓
91	Assess reflective abilities	✓	✓	x	✓
92	Give feedback to their teachers	✓	✓	✓	✓
93	Give feedback to a learner	✓	✓	✓	✓
94	Apply the principles of good feedback	✓	✓	✓	✓
95	Give feedback to their colleagues	✓	✓	✓	✓
96	Give appropriate academic feedback	✓	✓	✓	✓
97	Use a variety of techniques & approaches to provide constructive feedback to others	✓	✓	✓	✓
98	Prepare a PowerPoint presentation	✓	✓	✓	✓
99	Identify and make use of appropriate resources for particular learning outcomes	✓	✓	✓	✓
100	Prepare teaching and learning materials	✓	✓	✓	✓
101	Advise learners on appropriate use of library facilities	o	✓	✓	✓
102	Evaluate learning resources	✓	✓	✓	✓
103	Make appropriate use of learning technology and the internet for teaching	✓	✓	✓	✓
104	Identify and use multimedia resources in teaching, including images & video	✓	✓	✓	✓

105	Make appropriate use of clinical simulators	✓	x	✓	✓
106	Design effective educational texts including handouts, protocols and study guides	o	✓	x	o
107	Contribute to the preparation of multimedia learning resources	o	x	✓	o
108	Prepare e-learning / online resources	o	x	x	x
109	Prepare a learning plan and timescale	✓	✓	✓	✓
110	Apply the principles of outcome based education	✓	x	x	o
111	Select appropriate teaching and learning strategies for given learning outcomes	✓	✓	x	✓
112	Develop and negotiate learning outcomes for an educational programme	x	x	✓	x
113	Apply the principles of instructional design	o	x	x	x
114	Apply the principles of curriculum planning and development	x	x	✓	x
115	Design and develop a course or programme of training	x	x	x	x
116	Implement a planned course or programme of training	x	x	✓	x
117	Select learners for admission to or progression through an educational programme	x	x	x	x
118	Comply with relevant teaching recommendations and requirements	✓	✓	✓	✓
119	Interpret and comply with relevant training and assessment regulations	✓	✓	✓	✓
120	Follow relevant grievance and disciplinary procedures with their learners	✓	✓	✓	✓
121	Teach to institutional goals	✓	✓	x	✓
122	Appreciate doctor as manager of teaching including quality control	✓	✓	✓	✓
123	Appreciate the principles of managing change	o	✓	✓	✓
124	Ensure environments are adequate for learning	o	✓	✓	✓
125	Manage and support teaching	o	✓	✓	✓
126	Develop learning environments and educational facilities	o	x	✓	x
127	Demonstrate an appreciation and respect for colleagues	✓	✓	✓	✓
128	Appreciate the benefits of a multi-professional approach to clinical teaching	✓	✓	✓	✓
129	Adopt a team-based approach to teaching	✓	✓	✓	✓
130	Contribute to the appraisal of a colleague	✓	✓	✓	✓
131	Engage in inter-professional teaching	✓	✓	✓	✓
132	Conduct a formal appraisal of a colleague	✓	✓	✓	✓
133	Behave appropriately as a role model	✓	✓	✓	✓

134	Teach in an ethical and professional manner	✓	✓	✓	✓
135	Demonstrate empathy and respect for learners	✓	✓	✓	✓
136	Demonstrate appropriate attitudes towards teaching	✓	✓	✓	✓
137	Achieve an appropriate balance between teaching and other commitments	✓	✓	✓	✓
138	Seek, receive and act on feedback on their teaching	✓	✓	✓	✓
139	Identify their strengths and areas for improvement in teaching	✓	✓	✓	✓
140	Critically reflect and learn from teaching and learning experiences	✓	✓	✓	✓
141	Take advantage of opportunities to develop their teaching skills	✓	✓	✓	✓
142	Evaluate and enhance the effectiveness of their teaching	✓	✓	✓	✓
143	Demonstrate willingness to develop their teaching skills	✓	✓	✓	✓
144	Engage in continuing professional development as a teacher	✓	✓	✓	✓
145	Undertake significant event / critical incident analysis in relation to teaching	✓	✓	X	✓
146	Keep abreast of new teaching and learning techniques	✓	✓	X	✓
147	Engage in the scholarship of teaching	X	X	✓	X
148	Apply the principles of evidence-based medical education	✓	✓	✓	✓
149	Encourage high quality research in medical education	✓	✓	✓	✓
150	Appreciate the role of teacher as researcher	✓	✓	✓	✓
151	Identify, critique and apply insights from the educational literature	O	✓	X	O
152	Be familiar with literature sources on medical education	✓	✓	✓	✓
153	Undertake research in medical education	O	X	X	X

Appendix 7c – Teaching students reported receiving from FY1s

Please note that these are arranged according to the framework in Box 4.3, and so are not consecutive.

1. Informal opportunistic teaching

Focus group participants mentioned informal opportunistic teaching most often, and seemed to view this as the mainstay of FY1 teaching, "*I think a lot of the teaching you do, especially in the junior years, it's very off the cuff… I mean there are the prescribing tutorials, but a lot of it is very informal*" (Y5C2).

1 a) Involving medical students in day to day practice

i) Encouraging students to follow and observe practice

Many of the participants talked about learning by watching FY doctors at work, "*Seeing how somebody does something. Like just the manner, like how they go about doing their job is good*" (Y5A2). One participant said they thought this was the main way in which they had learned from FY1s, "*I think a lot of what you learn from the F1s and 2s is not through any active teaching they do, it's from like watching them*" (Y5A2). Some mentioned occasions when FY1s had explicitly invited them along to watch what they were doing, "*Like you just walk into a room and then it's like, 'Oh, I'll show you how to put in a ring block' or 'I'll show you how to do this*" (Y5A3).

ii) Providing a commentary and explanation of practice

In some cases they mentioned FY1s had explained to them what they were doing, "*Two minutes to explain something to a student can make a big difference*" (Y5C2).

iii) Responding to student questions

FY1s had answered some of the participants' questions, "*It's not 'Sit down' and you give a sort of lecture to a group of students… it's kind of as you're going along you're getting asked things*" (Y5C2).

v) Delegating tasks or responsibilities to students

One participant recalled an example placement where an FY1 had delegated clinical jobs for them to do on their own, which they had found particularly helpful, "*There was an FY1 who was just wonderful. I followed him around like a shadow and did loads of things. He would give me jobs*" (Y5B1).

1 b) Getting medical students to see patients on their own

i) Finding patients for students to see

Participants reported that FY1s had helped them find patients, and in some cases rather than waiting to be asked the FY1s had identified interesting patients and then sought out the students to suggest they see them, "*If there's an unusual condition or good signs, you know, they've come to us and said, 'Oh, you know, you should go and see this patient'*" (Y5C2).

ii) Getting students to 'clerk' and present patients

Some participants also mentioned being invited to come back and present the patient they had just seen to an FY1, "*You know, 'go and see this patient and come back'*" (Y5C2).

1 c) Observing or testing medical students and giving feedback

i) 'Bedside teaching'

Different types of bedside teaching were mentioned by participants, including informal types, "*Third year cardiology there was also FY1 teaching… bedside teaching taken by the FY1s, but it was formal in third year; whereas now it's more informal*" (Y5B4), and a more formal variant described under 3a below.

iii) Testing knowledge and clinical reasoning

Some examples were given of FY1s asking students about things and testing their knowledge and understanding, "*Anytime anything came up, he'd be 'Right, tell me about this'*" (Y5B1).

1 d) Giving medical students opportunistic 'mini tutorials'

Several examples were given where FY1s had opportunistically taught students on particular topics, "*When I was in general surgery, one of the FY1s pulled me aside and started teaching me about thyroid hormones*" (Y5A1).

1 e) Teaching doctors at the same or higher level

One of the participant talked about regular reciprocal FY1 teaching they had observed, "*At [peripheral hospital] it's the FY1s that teach other FY1s as well during certain lunch times… they'd sort of take it in turns to do stuff, and obviously there's always medical students present as well… It's stuff that they all see on the ward, but it's just to get a discussion going about, you know, 'this is how I manage it', or 'this is how the consultant manages it'*" (Y5C3).

1 f) Teaching nurses, nursing students and [NEW] allied health professionals

One participant mentioned that FY1s were also involved in teaching nurses, nursing students, and also other groups of allied health professionals such as physiotherapists, "*Medical students and other colleagues at the same level… then there's other specialities as well, so there's nurses, the nursing students, or physios and stuff, on simple things*" (Y5C1).

2. Semi-formal pre-arranged teaching

2 a) Having students on 'shadowing' placements

One of the participants said they had informally shadowed an FY1, "*I was going to say following them around, but that sounds a bit odd. Shadowing*" (Y5A2). One discussed a formal 'shadowing week' for Edinburgh students which they referred-to by name, "*I think the shadowing week is, like, just the week before*" (Y5C2).

2 b) Pre-arranged topic or case based tutorials

Participants mentioned two different types of pre-arranged tutorials, the first was case-related and involving a patient, "*The FY1 on our ward on gen med [general medicine] is quite keen to teach… he was like 'I'll be free at 3:30, come back and we'll go and see this patient and we can discuss the management'*" (Y5B4). The second was more theoretical, where FY1s would "*Just go in the library and one of the doctors would pitch up and go through ECG's or something. So there was sort of*

informal-formal teaching" (Y5C3). Generally these were arranged at relatively short notice at a mutually convenient time, "*They would just say 'Look, well I can teach you on this, what time would be…?', and we'd just, you know, whatever day*" (Y5C3).

2 e) [NEW] Pre-arranged formative assessments (e.g. mock OSCE)

One participant talked about an FY1 planning and delivering a mock OSCE (Objective Structured Clinical Examination) for students attached to their hospital, "*There's a student from Edinburgh who graduated last year and she is quite keen on teaching… and has organised a mock OSCE and things in May*" (Y5B1).

3. Formal organised teaching

3 a) Teaching as part of the 'Foundation Doctor Teaching Scheme'

The Foundation Doctor Teaching Scheme, and particularly 'Prescribing' tutorials, were mentioned in each of the focus groups as having been delivered by FY1s. As one participant said, "*I think that's the main formal thing we've had, prescribing tutorials*" (Y5B5). One group also discussed having been taught by FY1s in 'Bedside teachers' tutorials, saying that "*They get posted up on EEMeC with slots the same as prescribing, and the title is 'Bedside Teachers'… the FY1s put up times when they're available to teach*" (Y5B2). One of the participants elaborated further in saying, "*We had bedside things form the FY1s where they do bedside teaching… It usually lasts for an hour and we usually go and see a patient. There's about 3 or 4 people and we stand around a bed and examine somebody and take a history. Then the FY1 will comment on what we've done*" (Y5B2).

3 d) Giving presentations (+ NEW) and lectures

One participant offered an example of an FY1 contributing to a formal timetabled undergraduate lecture, "*In vertical themes week, I think, we had FY1s… giving lectures on what was going to happen next in careers and examples of stuff*" (Y5B3).

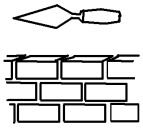
3 f) Identifying or creating learning resources

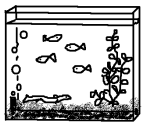
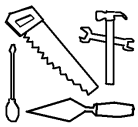
Participants in two of the focus groups described FY1s having provided them with written or electronic learning resources, "*Sometimes if they're keen then they'll e-mail us stuff at the end about thyroid examination and how to do it and that kind of stuff*" (Y5B2). It was not known whether the FY1s had produced these themselves or borrowed or adapted them from elsewhere. Such resources, however, seemed to have been much appreciated by the participants, "*He gave me a table that was very good and how to memorise 'these are the thyroid hormones, how do you measure them and how do you treat them?*' (Y5A1).

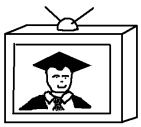
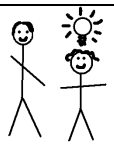
Appendix 8 – Relating teaching conceptions to suggested LO

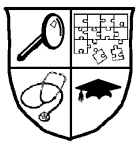
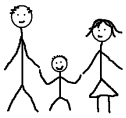
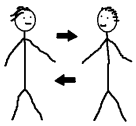
Appendix 8a – Mapping learning outcomes from the expert Delphi to conceptions of teaching from the literature and study findings

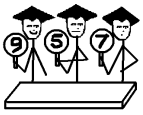
The table below presents a framework analysis of the 153 learning outcomes derived from the expert Delphi using the 25 conceptions of teaching from the literature review and study findings. LO which all three groups thought should NOT be core for the undergraduate medical curriculum are shown in bold italics, and all other LO are shown in plain text.

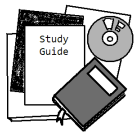
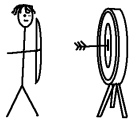
No	Conception of teaching	Learning outcome from Delphi
1	 **PRODUCTION (poiesis)**	None
2	 **PRACTICE (praxis)**	1. Recognise the importance of teaching for their profession and practice 10. Describe what being a teacher means to them 11. Teach patients 12. Teach peers / colleagues 13. Teach medical students 14. Demonstrate willingness to teach colleagues 15. Teach more junior trainees 16. Teach nurses and other healthcare professionals 127. Demonstrate an appreciation and respect for colleagues 134. Teach in an ethical and professional manner 136. Demonstrate appropriate attitudes towards teaching 137. Achieve an appropriate balance between teaching and other commitments
3	 **SCIENCE (theoria)**	149. Encourage high quality research in medical education 150. Appreciate the role of teacher as researcher ***153. Undertake research in medical education***
4	 **COMMON SENSE**	None
5	 **ART**	9. Be creative and resourceful in their teaching approach

No	Conception of teaching	Learning outcome from Delphi
6	 **SYSTEM**	***117. Select learners for admission to or progression through an educational programme*** 124. Ensure environments are adequate for learning 126. Develop learning environments and educational facilities 128. Appreciate the benefits of a multi-professional approach to clinical teaching 129. Adopt a team-based approach to teaching 131. Engage in inter-professional teaching
7	 **REFLECTIVE PRACTICE**	91. Assess reflective abilities 92. Give feedback to their teachers 93. Give feedback to a learner 94. Apply the principles of good feedback 95. Give feedback to their colleagues 96. Give appropriate academic feedback 97. Use a variety of techniques & approaches to provide constructive feedback to others
8	 **COMPETENCE**	6. Demonstrate appropriate teaching skills 38. Effectively use a range of teaching techniques and strategies 42. Teach using mind maps 48. Deliver formal planned teaching 50. Choose appropriate small group teaching methods 53. Deliver one-to-one teaching 60. Lead a small group tutorial 62. Teach effectively in a variety of different situations 65. Facilitate a problem based learning tutorial 67. Teach at a distance ***68. Organise and run a video or telephone conference***
9	 **DIRECTING ACTIVITY**	45. Plan a teaching session 46. Lead the delivery of a teaching session 47. Plan and design learning opportunities 51. Sequence teaching and learning activities to address learning outcomes 109. Prepare a learning plan and timescale ***113. Apply the principles of instructional design*** ***114. Apply the principles of curriculum planning and development*** ***115. Design and develop a course or programme of training*** ***116. Implement a planned course or programme of training***
10	 **IMPARTING INFORMATION**	31. Teach knowledge-based content 37. Present information in a structured, logical sequence

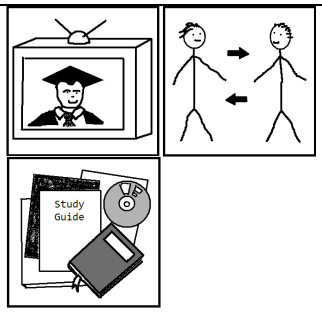
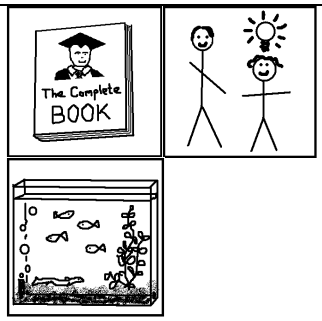
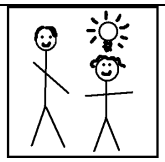
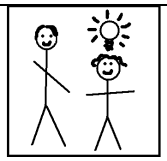
No	Conception of teaching	Learning outcome from Delphi
11	 **TRANSMISSION**	2. Communicate effectively in a teaching context 35. Respond appropriately to learner questions 36. Explain concepts effectively 39. Break down complex topics into learning points 52. Gain audience participation / interaction in a large group presentation 63. Prepare and deliver a presentation or lecture to a large group
12	 **APPRENTICESHIP**	8. Identify and use informal and unplanned opportunities for teaching 29. Demonstrate clinical skills 30. Teach practical clinical skills 32. Demonstrate and help learners to develop appropriate attitudes 33. Teach communication skills 34. Teach decision-making skills 40. Deal with challenging learner behaviours 54. Teach in clinical situations 55. Teach at the bedside 56. Teach on the ward 57. Teach in a clinical skills unit 58. Teach 'on take' 59. Teach in outpatient clinics 64. Teach in the community 66. Teach in theatre 133. Behave appropriately as a role model
13	 **FACILITATING UNDERSTANDING**	18. Adopt a learner-centred approach to teaching 23. Apply their understanding of how individuals learn 28. Adopt a constructivist approach to teaching and learning
14	 **SUPPORTING GROWTH**	4. Support and encourage learners 17. Mentor more junior trainees 22. Facilitate learner self-assessment 24. Help others undertake self-directed learning 61. Facilitate experiential and work based learning
15	 **SUPPORTING TRANSFORMATION**	None
16	 **SOCIAL REFORM**	None

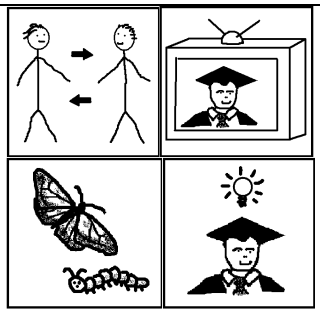
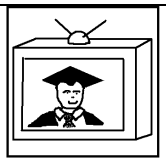
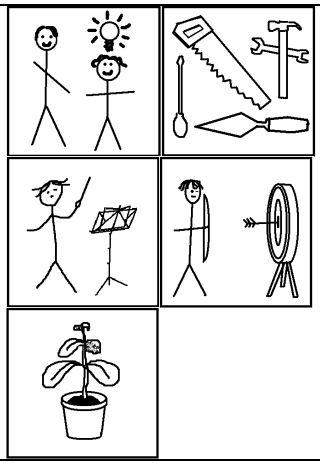
No	Conception of teaching	Learning outcome from Delphi
17	 **MANAGED PROCESS**	3. Recognise and carry out their obligations in relation to teaching and learning 44. Evaluate a teaching session 72. Monitor student progress and achievement of learning outcomes 118. Comply with relevant teaching recommendations and requirements 119. Interpret and comply with relevant training and assessment regulations 120. Follow relevant grievance and disciplinary procedures with their learners 121. Teach to institutional goals 122. Appreciate doctor as manager of teaching including quality control 123. Appreciate the principles of managing change 125. Manage and support teaching 130. Contribute to the appraisal of a colleague 132. Conduct a formal appraisal of a colleague
18	 **SCHOLARSHIP**	26. Apply their understanding of educational theory and principles 146. Keep abreast of new teaching and learning techniques 147. Engage in the scholarship of teaching 148. Apply the principles of evidence-based medical education 151. Identify, critique and apply insights from the educational literature 152. Be familiar with literature sources on medical education
19	 **PARENT – CHILD INTERACTION**	None
20	 **ADULT – ADULT INTERACTION**	5. Engage with learners at an appropriate level 135. Demonstrate empathy and respect for learners 49. Seek participation from all involved in a teaching session

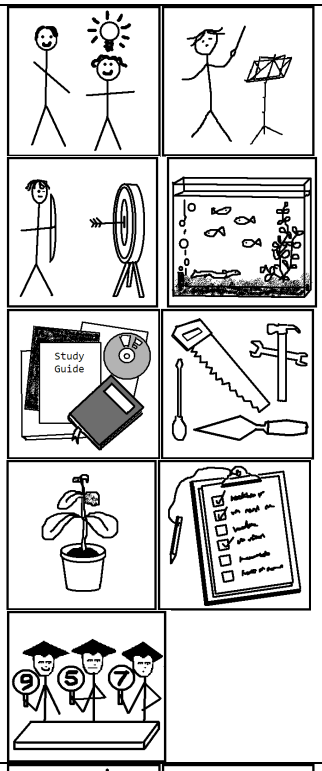
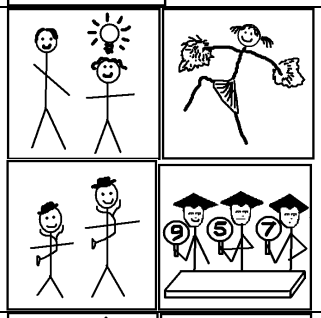
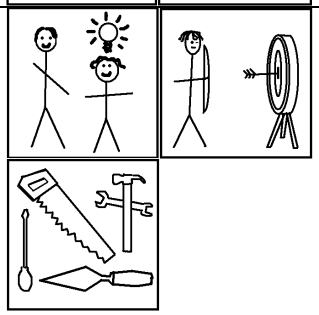
No	Conception of teaching	Learning outcome from Delphi
21	 **LEARNING ACTIVITY**	25. Reflect on their own and others' preferred learning styles 27. Describe their own learning style 140. Critically reflect and learn from teaching and learning experiences 138. Seek, receive and act on feedback on their teaching 139. Identify their strengths and areas for improvement in teaching 141. Take advantage of opportunities to develop their teaching skills 142. Evaluate and enhance the effectiveness of their teaching 143. Demonstrate willingness to develop their teaching skills 144. Engage in continuing professional development as a teacher 145. Undertake significant event / critical incident analysis in relation to teaching
22	 **ASSESSMENT**	41. Use a range of questioning techniques in their teaching 69. Assess formatively 70. Carry out workplace-based assessments 71. Make a global judgement about performance 73. Assess performance using a mark scheme 74. Assess summatively 75. Write assessment questions 76. Examine in an Objective Structured Clinical Exam (OSCE) 77. Devise an appropriate assessment for specified learning outcomes 78. Assess written work and portfolios 79. Set appropriate assessment standards 80. Apply the theory and principles of assessment 81. Make appropriate use of computers in assessment ***82. Participate in a formal Board of Examiners*** 83. Assess practical clinical skills 84. Assess medical students 85. Assess performance in clinical practice 86. Assess behaviours 87. Assess a peer / colleague 88. Assess attitudes 89. Assess more junior trainees 90. Assess knowledge

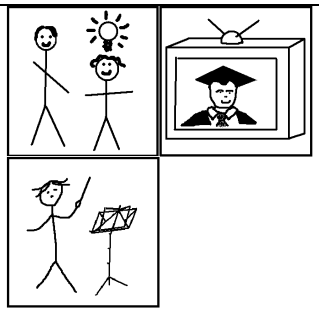
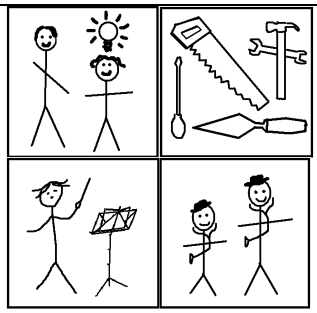
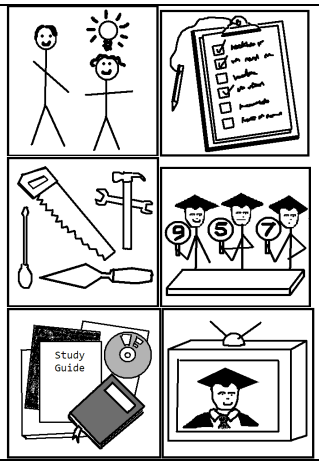
No	Conception of teaching	Learning outcome from Delphi
23	 **PROVIDING RESOURCES**	98. Prepare a PowerPoint presentation 99. Identify and make use of appropriate resources for particular learning outcomes 100. Prepare teaching and learning materials 101. Advise learners on appropriate use of library facilities 102. Evaluate learning resources 103. Make appropriate use of learning technology and the internet for teaching 104. Identify and use multimedia resources in teaching, including images & video 105. Make appropriate use of clinical simulators 106. Design effective educational texts including handouts, protocols and study guides 107. Contribute to the preparation of multimedia learning resources 108. Prepare e-learning / online resources
24	 **TARGETING LEARNING NEEDS**	19. Help learners find ways to address their learning needs 20. Help learners identify their learning needs 21. Negotiate with students areas to be taught 43. Define learning outcomes / objectives for a teaching session 110. Apply the principles of outcome based education 111. Select appropriate teaching and learning strategies for given learning outcomes 112. Develop and negotiate learning outcomes for an educational programme
25	 **GENERATING ENTHUSIASM**	7. Enthuse and motivate learners

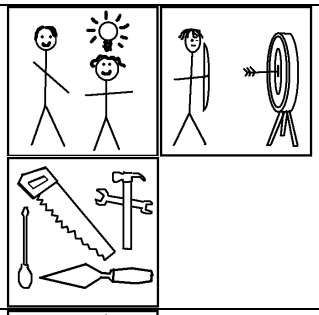
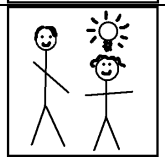
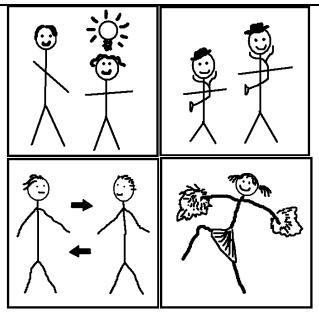
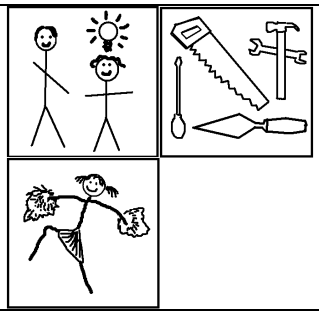
Appendix 8b – Conceptions of teaching (mapped to 25 conceptions) and spontaneous opinions on LO for the UG medical curriculum (mapped to 153 LO) by participant

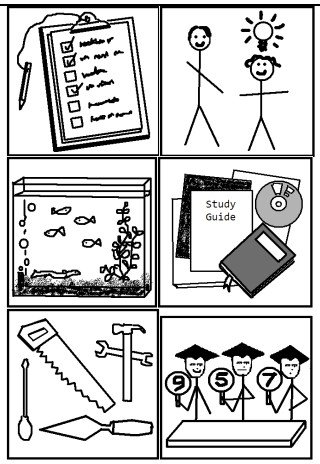
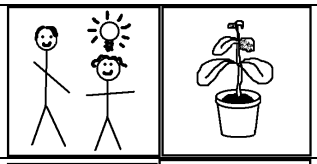
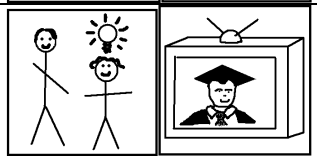
ID	Conceptions of teaching	Should medical students learn to teach ?	Spontaneous learning outcomes in teaching suggested for UK undergraduate medical curriculum
EU01		**Yes**	11. Teach patients 13. Teach medical students 15. Teach more junior trainees 37. Present information in a structured, logical sequence 39. Break down complex topics into learning points 43. Define learning outcomes / objectives for a teaching session 45. Plan a teaching session 46. Lead the delivery of a teaching session 51. Sequence teaching and learning activities to address learning outcomes 60. Lead a small group tutorial 63. Prepare and deliver a presentation or lecture to a large group 87. Assess a peer / colleague 95. Give feedback to their colleagues 98. Prepare a PowerPoint presentation 130. Contribute to the appraisal of a colleague
EU02		**Yes**	3. Recognise and carry out their obligations in relation to teaching and learning 19. Help learners find ways to address their learning needs 20. Help learners identify their learning needs 26. Apply their understanding of educational theory & principles 38. Effectively use a range of teaching techniques and strategies 60. Lead a small group tutorial 63. Prepare and deliver a presentation or lecture to a large group 96. Give appropriate academic feedback 129. Adopt a team-based approach to teaching 142. Evaluate and enhance the effectiveness of their teaching
EU03		**Equivocal**	43. Define learning outcomes / objectives for a teaching session 44. Evaluate a teaching session 45. Plan a teaching session 115. Design and develop a course or programme of training
EU04		**Yes**	35. Respond appropriately to learner questions 60. Lead a small group tutorial 63. Prepare and deliver a presentation or lecture to a large group 92. Give feedback to their teachers 95. Give feedback to their colleagues 131. Engage in inter-professional teaching

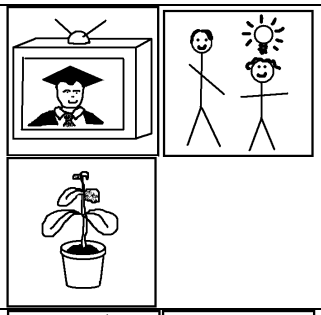
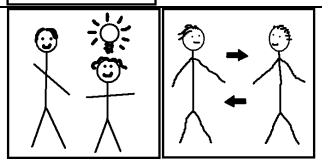
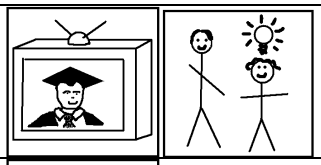
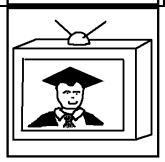
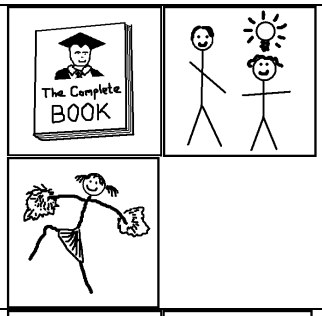
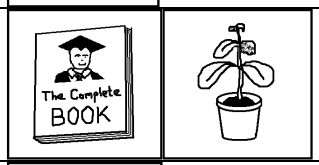
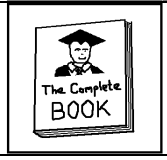
ID	Conceptions of teaching	Should medical students learn to teach ?	Spontaneous learning outcomes in teaching suggested for UK undergraduate medical curriculum
EU05		**Yes**	10. Describe what being a teacher means to them 25. Reflect on their own and others' preferred learning styles 40. Deal with challenging learner behaviours 43. Define learning outcomes / objectives for a teaching session 44. Evaluate a teaching session 60. Lead a small group tutorial 63. Prepare and deliver a presentation or lecture to a large group 74. Assess summatively 94. Apply the principles of good feedback 103. Make appropriate use of learning technology and the internet for teaching
EU06		**Yes**	11. Teach patients "*I would use the requirements of Tomorrow's Doctors identified in [question number] 5 as learning outcomes*" 6. Demonstrate appropriate teaching skills 12. Teach peers / colleagues 14. Demonstrate willingness to teach colleagues 17. Mentor more junior trainees 95. Give feedback to their colleagues 130. Contribute to the appraisal of a colleague 141. Take advantage of opportunities to develop their teaching skills 143. Demonstrate willingness to develop their teaching skills
EU07		**Yes**	5. Engage with learners at an appropriate level 7. Enthuse and motivate learners 13. Teach medical students 17. Mentor more junior trainees 21. Negotiate with students areas to be taught 43. Define learning outcomes / objectives for a teaching session 45. Plan a teaching session 47. Plan and design learning opportunities 96. Give appropriate academic feedback 138. Seek, receive and act on feedback on their teaching 139. Identify their strengths and areas for improvement in teaching 140. Critically reflect and learn from teaching and learning experiences

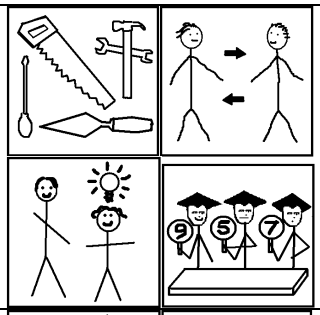
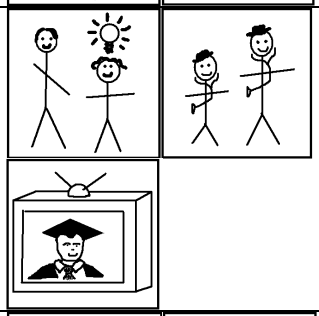
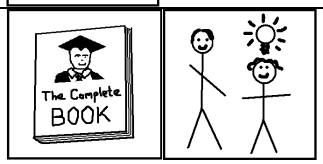
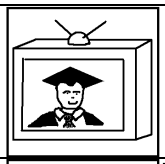
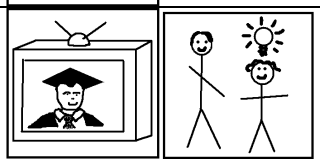
ID	Conceptions of teaching	Should medical students learn to teach ?	Spontaneous learning outcomes in teaching suggested for UK undergraduate medical curriculum
EU08		**Yes**	3. Recognise and carry out their obligations in relation to teaching and learning 26. Apply their understanding of educational theory and principles 30. Teach practical clinical skills 43. Define learning outcomes / objectives for a teaching session 54. Teach in clinical situations 60. Lead a small group tutorial 63. Prepare and deliver a presentation or lecture to a large group 70. Carry out workplace-based assessments 75. Write assessment questions 85. Assess performance in clinical practice 97. Use a variety of techniques & approaches to provide constructive feedback to others 134. Teach in an ethical and professional manner 140. Critically reflect and learn from teaching and learning experiences
EU09		**Yes**	2. Communicate effectively in a teaching context 6. Demonstrate appropriate teaching skills 11. Teach patients 74. Assess summatively 103. Make appropriate use of learning technology and the internet for teaching
EU10		**Yes**	11. Teach patients 17. Mentor more junior trainees 20. Help learners identify their learning needs 45. Plan a teaching session 60. Lead a small group tutorial 63. Prepare and deliver a presentation or lecture to a large group 69. Assess formatively 84. Assess medical students 111. Select appropriate teaching and learning strategies for given learning outcomes 142. Evaluate and enhance the effectiveness of their teaching

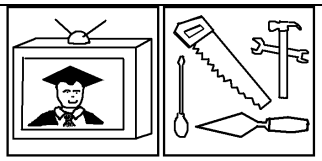
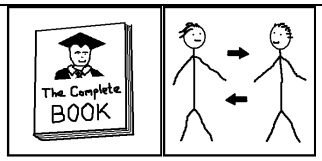
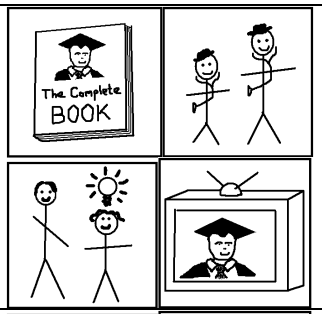
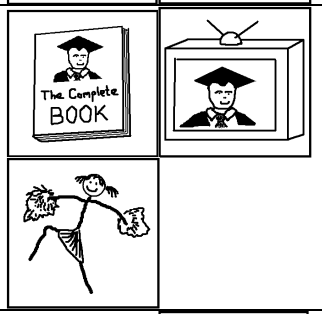
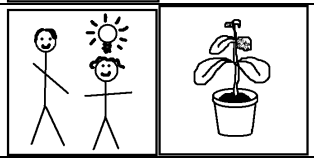
ID	Conceptions of teaching	Should medical students learn to teach ?	Spontaneous learning outcomes in teaching suggested for UK undergraduate medical curriculum
EP01		**Yes**	11. Teach patients 13. Teach medical students 15. Teach more junior trainees 18. Adopt a learner-centred approach to teaching 23. Apply their understanding of how individuals learn 28. Adopt a constructivist approach to teaching and learning 29. Demonstrate clinical skills 36. Explain concepts effectively 41. Use a range of questioning techniques in their teaching 43. Define learning outcomes / objectives for a teaching session 49. Seek participation from all involved in a teaching session 54. Teach in clinical situations 60. Lead a small group tutorial 63. Prepare and deliver a presentation or lecture to a large group 77. Devise an appropriate assessment for specified learning outcomes 83. Assess practical clinical skills 84. Assess medical students 90. Assess knowledge 92. Give feedback to their teachers 93. Give feedback to a learner 140. Critically reflect and learn from teaching and learning experiences
EP02		**Yes**	27. Describe their own learning style 29. Demonstrate clinical skills 35. Respond appropriately to learner questions 41. Use a range of questioning techniques in their teaching 60. Lead a small group tutorial 63. Prepare and deliver a presentation or lecture to a large group 94. Apply the principles of good feedback 96. Give appropriate academic feedback 140. Critically reflect and learn from teaching and learning experiences
EP03		**Yes**	4. Support and encourage learners 23. Apply their understanding of how individuals learn 53. Deliver one-to-one teaching 55. Teach at the bedside 60. Lead a small group tutorial 61. Facilitate experiential and work based learning 63. Prepare and deliver a presentation or lecture to a large group 133. Behave appropriately as a role model

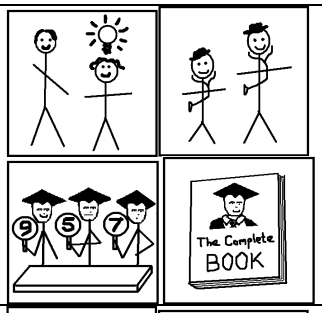
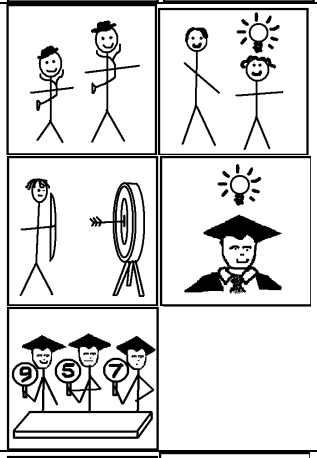
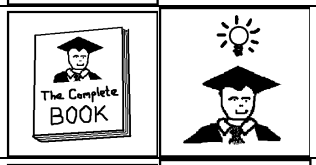
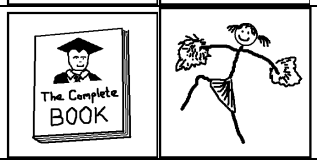
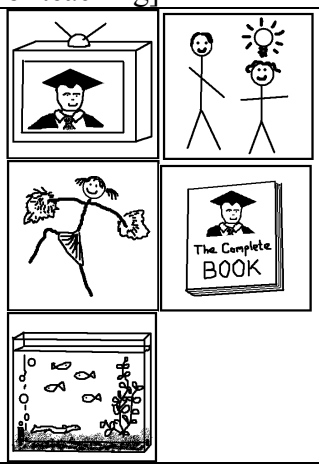
ID	Conceptions of teaching	Should medical students learn to teach ?	Spontaneous learning outcomes in teaching suggested for UK undergraduate medical curriculum
EP04		**No**	None
EP05		**Yes**	70. Carry out workplace-based assessments 76. Examine in an Objective Structured Clinical Examination (OSCE) 89. Assess more junior trainees 134. Teach in an ethical and professional manner Also wrote "*Please look at the outcomes of a good teacher in the Hesketh et al 2001 paper*", LO from this are not included here
EP06		**Yes**	17. Mentor more junior trainees 26. Apply their understanding of educational theory and principles 38. Effectively use a range of teaching techniques and strategies 96. Give appropriate academic feedback 130. Contribute to the appraisal of a colleague 131. Engage in inter-professional teaching 138. Seek, receive and act on feedback on their teaching 140. Critically reflect and learn from teaching and learning experiences 147. Engage in the scholarship of teaching 148. Apply the principles of evidence-based medical education 151. Identify, critique and apply insights from the educational literature
EP07		**Equivocal**	11. Teach patients 91. Assess reflective abilities 92. Give feedback to their teachers 140. Critically reflect and learn from teaching and learning experiences 144. Engage in continuing professional development as a teacher 145. Undertake significant event / critical incident analysis in relation to teaching

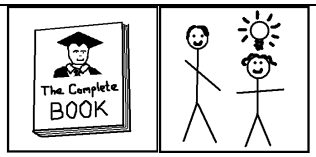
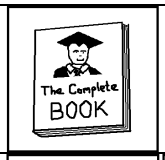
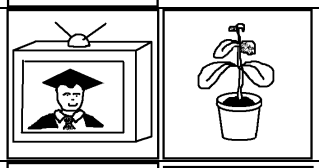
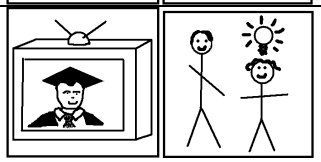
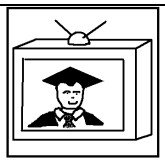
ID	Conceptions of teaching	Should medical students learn to teach ?	Spontaneous learning outcomes in teaching suggested for UK undergraduate medical curriculum
EP08		**Equivocal**	2. Communicate effectively in a teaching context 22. Facilitate learner self-assessment 24. Help others undertake self-directed learning 25. Reflect on their own and others' preferred learning styles 26. Apply their understanding of educational theory and principles 29. Demonstrate clinical skills 42. Teach using mind maps 43. Define learning outcomes / objectives for a teaching session 48. Deliver formal planned teaching 53. Deliver one-to-one teaching 60. Lead a small group tutorial 62. Teach effectively in a variety of different situations 65. Facilitate a problem based learning tutorial 63. Prepare and deliver a presentation or lecture to a large group 74. Assess summatively 87. Assess a peer / colleague 94. Apply the principles of good feedback 96. Give appropriate academic feedback 103. Make appropriate use of learning technology and the internet for teaching 112. Develop and negotiate learning outcomes for an educational programme 124. Ensure environments are adequate for learning 126. Develop learning environments and educational facilities
FY01		**Yes**	6. Demonstrate appropriate teaching skills 139. Identify their strengths and areas for improvement in teaching 141. Take advantage of opportunities to develop their teaching skills
FY02		**Yes**	13. Teach medical students 25. Reflect on their own and others' preferred learning styles 55. Teach at the bedside 60. Lead a small group tutorial 140. Critically reflect and learn from teaching and learning experiences
FY03		**Equivocal**	5. Engage with learners at an appropriate level 13. Teach medical students 20. Help learners identify their learning needs 23. Apply their understanding of how individuals learn 25. Reflect on their own and others' preferred learning styles 46. Lead the delivery of a teaching session 54. Teach in clinical situations 55. Teach at the bedside 63. Prepare and deliver a presentation or lecture to a large group 98. Prepare a PowerPoint presentation

ID	Conceptions of teaching	Should medical students learn to teach ?	Spontaneous learning outcomes in teaching suggested for UK undergraduate medical curriculum
FY04		**Yes**	5. Engage with learners at an appropriate level 37. Present information in a structured, logical sequence 46. Lead the delivery of a teaching session 63. Prepare and deliver a presentation or lecture to a large group
FY05		**Yes**	11. Teach patients 13. Teach medical students 46. Lead the delivery of a teaching session 62. Teach effectively in a variety of different situations 111. Select appropriate teaching and learning strategies for given learning outcomes 138. Seek, receive and act on feedback on their teaching 140. Critically reflect and learn from teaching and learning experiences
FY06		**Yes**	13. Teach medical students 30. Teach practical clinical skills 31. Teach knowledge-based content 54. Teach in clinical situations
FY07		**Yes**	26. Apply their understanding of educational theory and principles 30. Teach practical clinical skills 46. Lead the delivery of a teaching session 60. Lead a small group tutorial 63. Prepare and deliver a presentation or lecture to a large group 138. Seek, receive and act on feedback on their teaching 139. Identify their strengths and areas for improvement in teaching
FY08		**Yes**	4. Support and encourage learners 5. Engage with learners at an appropriate level 12. Teach peers / colleagues 13. Teach medical students 49. Seek participation from all involved in a teaching session 60. Lead a small group tutorial 90. Assess knowledge 140. Critically reflect and learn from teaching and learning experiences
FY09		**Yes**	3. Recognise and carry out their obligations in relation to teaching and learning 23. Apply their understanding of how individuals learn 27. Describe their own learning style 60. Lead a small group tutorial
FY10		**Yes**	18. Adopt a learner-centred approach to teaching 63. Prepare and deliver a presentation or lecture to a large group 111. Select appropriate teaching and learning strategies for given learning outcomes

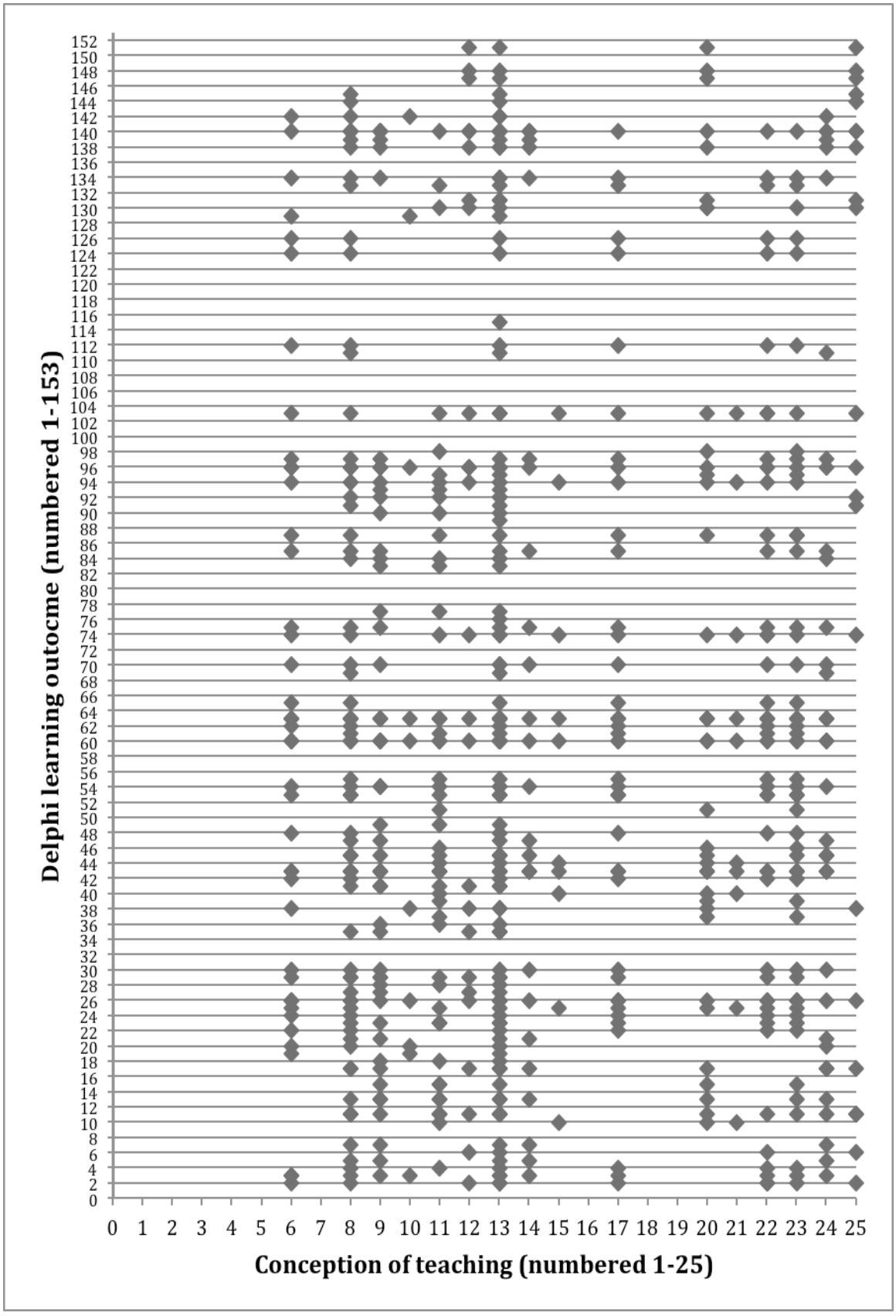
ID	Conceptions of teaching	Should medical students learn to teach ?	Spontaneous learning outcomes in teaching suggested for UK undergraduate medical curriculum
FY11		**Yes**	36. Explain concepts effectively 43. Define learning outcomes / objectives for a teaching session 44. Evaluate a teaching session 45. Plan a teaching session 60. Lead a small group tutorial 96. Give appropriate academic feedback
FY12		**Yes**	26. Apply their understanding of educational theory and principles 44. Evaluate a teaching session 140. Critically reflect and learn from teaching and learning experiences 141. Take advantage of opportunities to develop their teaching skills
FY13		**Yes**	30. Teach practical clinical skills 54. Teach in clinical situations 55. Teach at the bedside 63. Prepare and deliver a presentation or lecture to a large group 92. Give feedback to their teachers 138. Seek, receive and act on feedback on their teaching 140. Critically reflect and learn from teaching and learning experiences
FY14		**No**	None
FY15		**Equivocal**	5. Engage with learners at an appropriate level 11. Teach patients 18. Adopt a learner-centred approach to teaching 23. Apply their understanding of how individuals learn 45. Plan a teaching session 46. Lead the delivery of a teaching session 49. Seek participation from all involved in a teaching session 50. Choose appropriate small group teaching methods 52. Gain audience participation / interaction in a large group presentation 60. Lead a small group tutorial 63. Prepare and deliver a presentation or lecture to a large group 94. Apply the principles of good feedback 96. Give appropriate academic feedback

ID	Conceptions of teaching	Should medical students learn to teach ?	Spontaneous learning outcomes in teaching suggested for UK undergraduate medical curriculum
FY16		**Equivocal**	63. Prepare and deliver a presentation or lecture to a large group 70. Carry out workplace-based assessments 87. Assess a peer / colleague 92. Give feedback to their teachers 95. Give feedback to their colleagues 96. Give appropriate academic feedback 97. Use a variety of techniques & approaches to provide constructive feedback to others 111. Select appropriate teaching and learning strategies for given learning outcomes
FY17		**Yes**	3. Recognise and carry out their obligations in relation to teaching and learning 13. Teach medical students 25. Reflect on their own and others' preferred learning styles 52. Gain audience participation / interaction in a large group presentation 53. Deliver one-to-one teaching 54. Teach in clinical situations 55. Teach at the bedside 60. Lead a small group tutorial 63. Prepare and deliver a presentation or lecture to a large group 93. Give feedback to a learner 96. Give appropriate academic feedback 98. Prepare a PowerPoint presentation 124. Ensure environments are adequate for learning
FY18		**Yes**	5. Engage with learners at an appropriate level 21. Negotiate with students areas to be taught 38. Effectively use a range of teaching techniques and strategies 63. Prepare and deliver a presentation or lecture to a large group
FY19		**Equivocal**	11. Teach patients 36. Explain concepts effectively 140. Critically reflect and learn from teaching and learning experiences
Y5A1		**No**	None

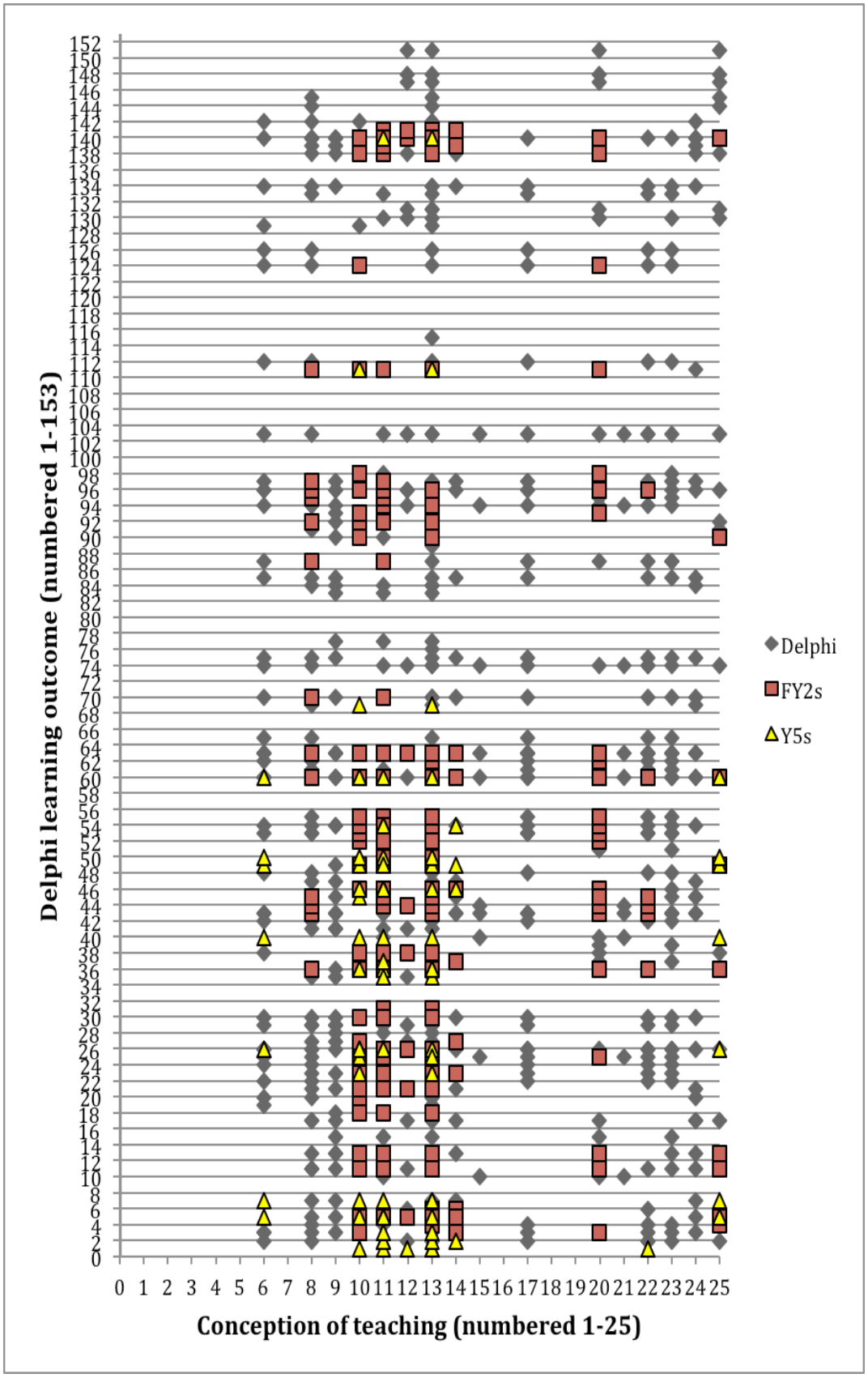
ID	Conceptions of teaching	Should medical students learn to teach ?	Spontaneous learning outcomes in teaching suggested for UK undergraduate medical curriculum
Y5A2		**No**	1. Recognise the importance of teaching for their profession and practice
Y5A3		**No**	None
Y5A4		**Equivocal**	None
Y5B1		**Yes**	None
Y5B2	X [participant did not articulate a conception of teaching]	**Equivocal**	None
Y5B3		**Yes**	5. Engage with learners at an appropriate level 7. Enthuse and motivate learners 26. Apply their understanding of educational theory and principles 40. Deal with challenging learner behaviours 49. Seek participation from all involved in a teaching session 50. Choose appropriate small group teaching methods 60. Lead a small group tutorial

ID	Conceptions of teaching	Should medical students learn to teach ?	Spontaneous learning outcomes in teaching suggested for UK undergraduate medical curriculum
Y5B4		**Yes**	23. Apply their understanding of how individuals learn 25. Reflect on their own and others' preferred learning styles 36. Explain concepts effectively 69. Assess formatively 111. Select appropriate teaching and learning strategies for given learning outcomes
Y5B5		**Yes**	26. Apply their understanding of educational theory and principles 45. Plan a teaching session 46. Lead the delivery of a teaching session
Y5C1		**Yes**	2. Communicate effectively in a teaching context 46. Lead the delivery of a teaching session 49. Seek participation from all involved in a teaching session 54. Teach in clinical situations
Y5C2		**Yes**	1. Recognise the importance of teaching for their profession and practice 2. Communicate effectively in a teaching context 3. Recognise and carry out their obligations in relation to teaching and learning 35. Respond appropriately to learner questions 36. Explain concepts effectively 46. Lead the delivery of a teaching session 140. Critically reflect and learn from teaching and learning experiences
Y5C3		**Yes**	5. Engage with learners at an appropriate level 35. Respond appropriately to learner questions 37. Present information in a structured, logical sequence 46. Lead the delivery of a teaching session 54. Teach in clinical situations

Appendix 8c – Delphi participant conceptions of teaching cross-tabulated with their spontaneous LO suggestions



Appendix 8d – 3 groups conceptions of teaching cross-tabulated with their spontaneous LO suggestions



This thesis was successfully defended by viva examination on 3rd April 2012.

Thank you to the chairperson, Dr Hamish Macleod, and to the examiners,
Professor Jill Morrison, Professor Ian Watt and Dr Ken McCulloch,
for their insightful and knowledgeable questions, observations and suggestions,
and for making the whole experience both enjoyable and inspiring.

If you have any comments or questions relating to any aspect
of this research, please e-mail me directly at:

michael.ross@ed.ac.uk

Cover: Twenty-five conceptions of teaching identified in this research from the literature and from data collection

THE UNIVERSITY *of* EDINBURGH